

Evaluation of the Q3FY16 GFS

National Hurricane Center

March 3, 2016

Evaluation Details:

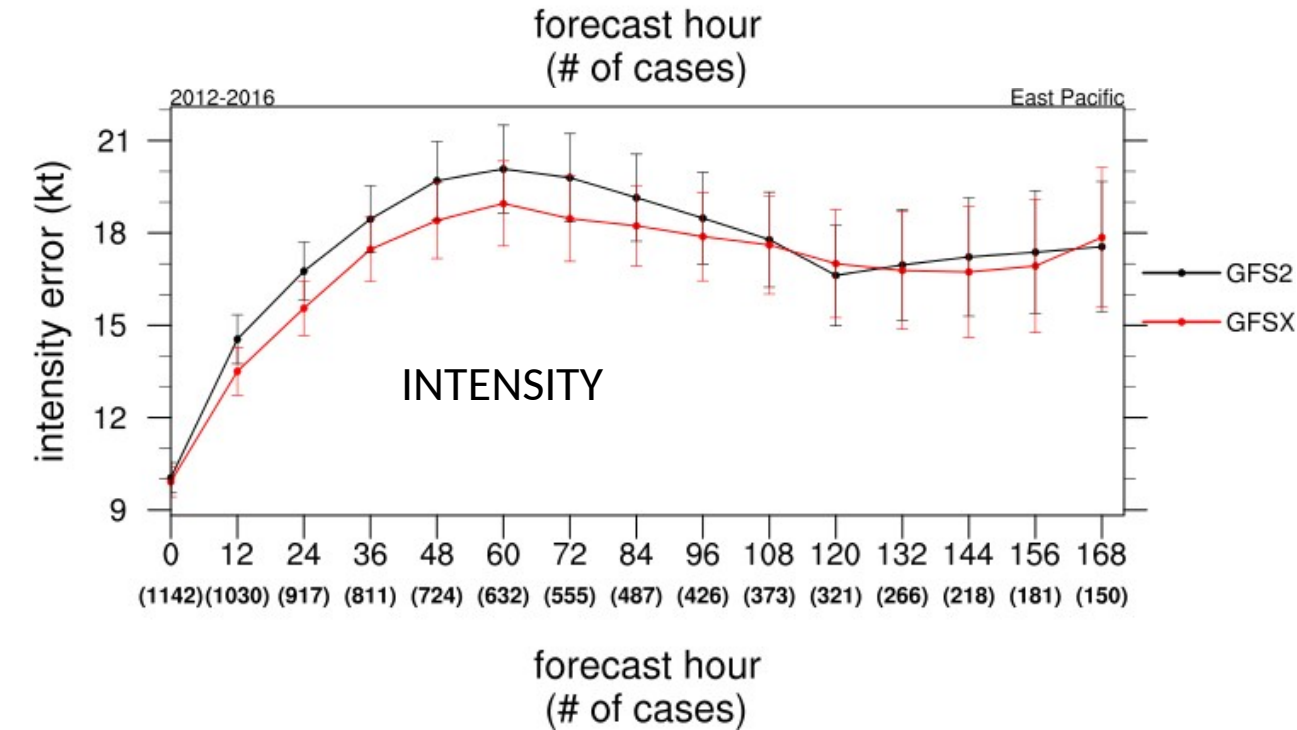
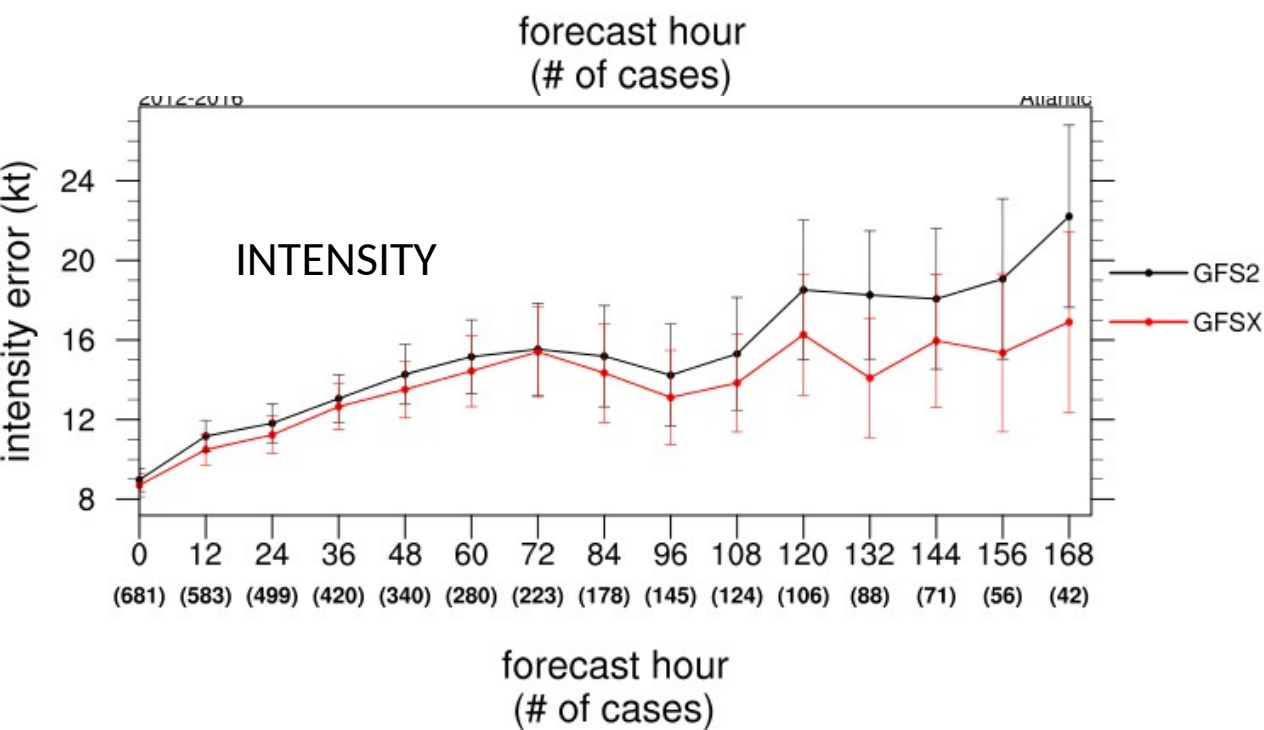
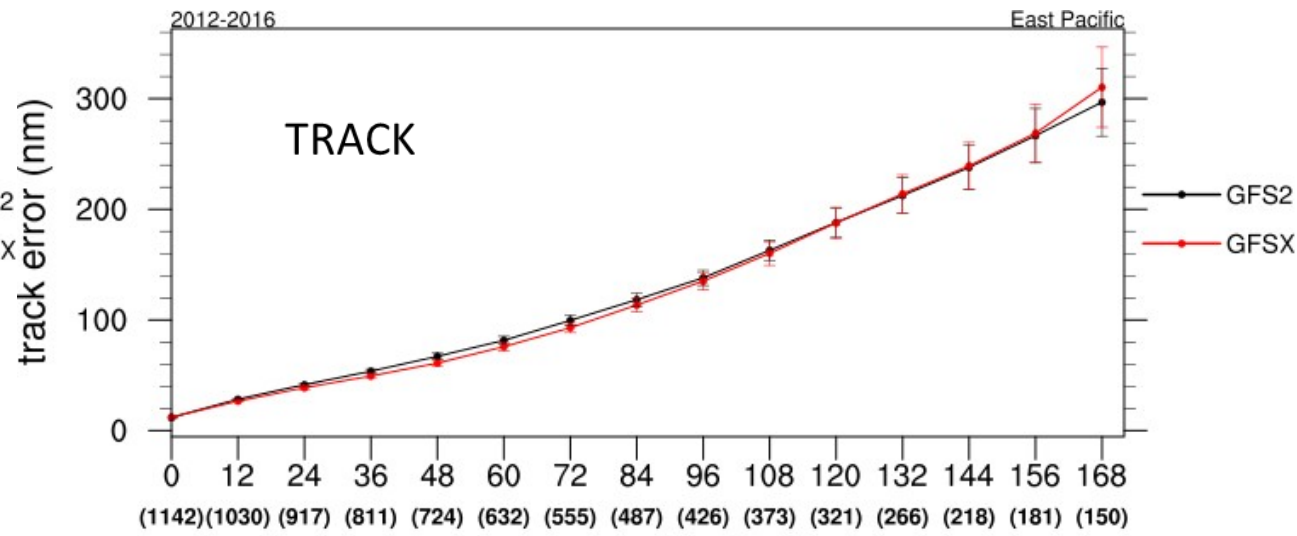
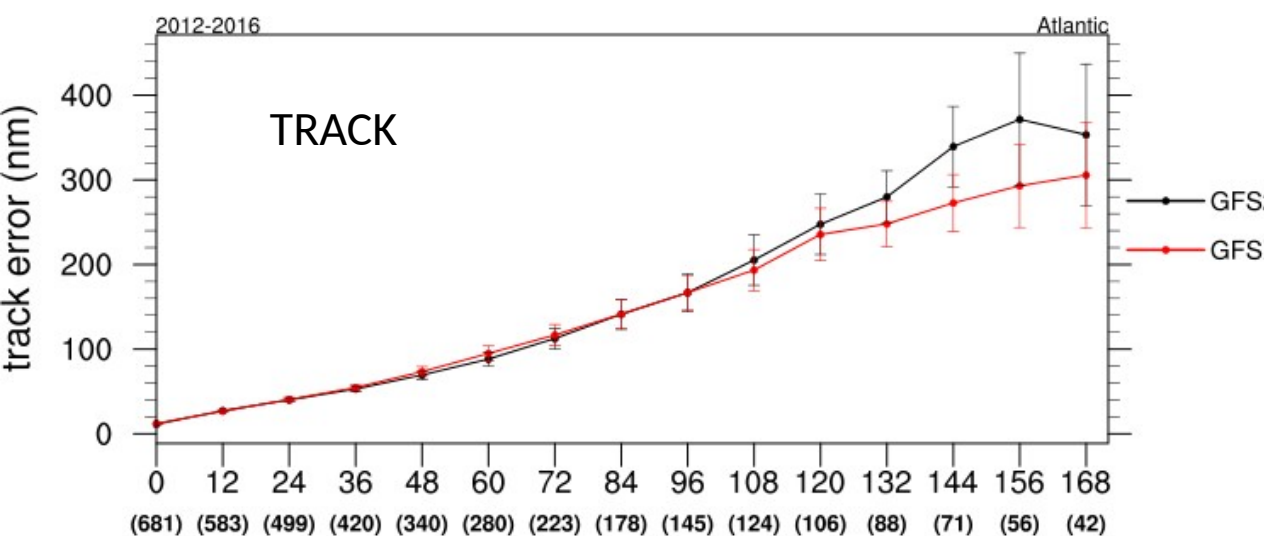
- Track and intensity error analysis from the 2012-2016 retrospective runs for the Atlantic and eastern North Pacific basins
 - Q3FY2016 GFS is also called “GFSX” or “GFSP”
 - GFS2 is the 2015 GFS
 - combined 2012-2016 track error statistics by basin
 - comparison of error characteristics with respect to the 2015 GFS
- Closer examination of a few high-impact events during the retrospective time period
- Verification of model-predicted TC genesis
- Evaluation by Tropical Analysis and Forecast Branch

2012-2016

Atlantic

Track/Intensity Error

East Pacific

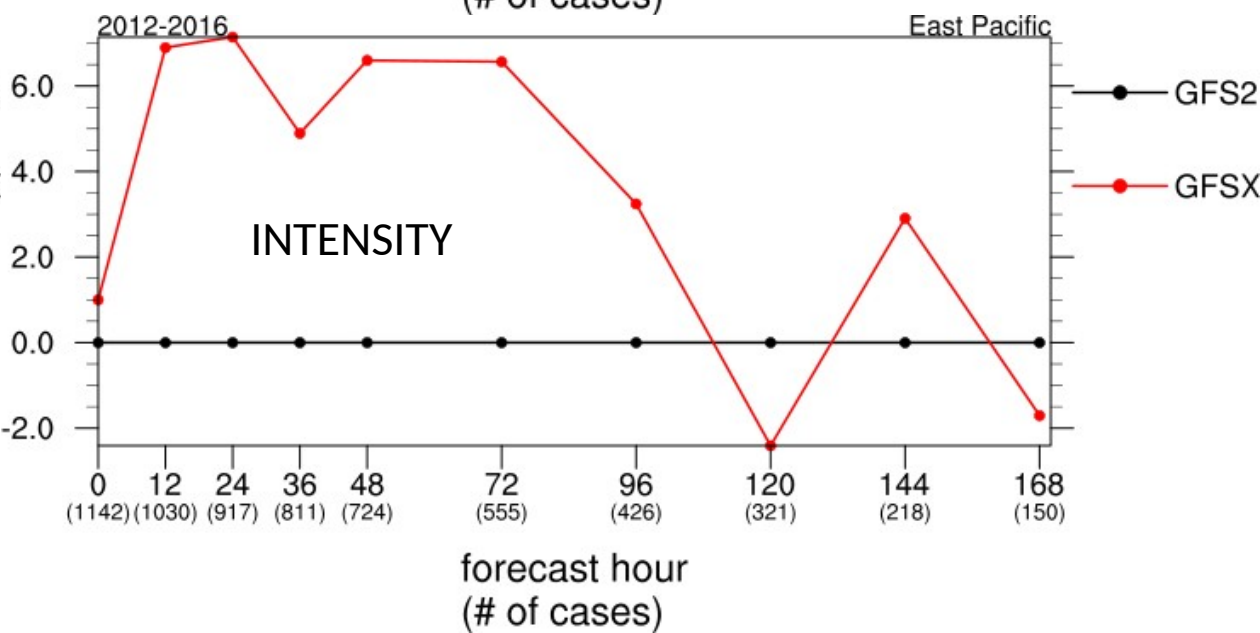
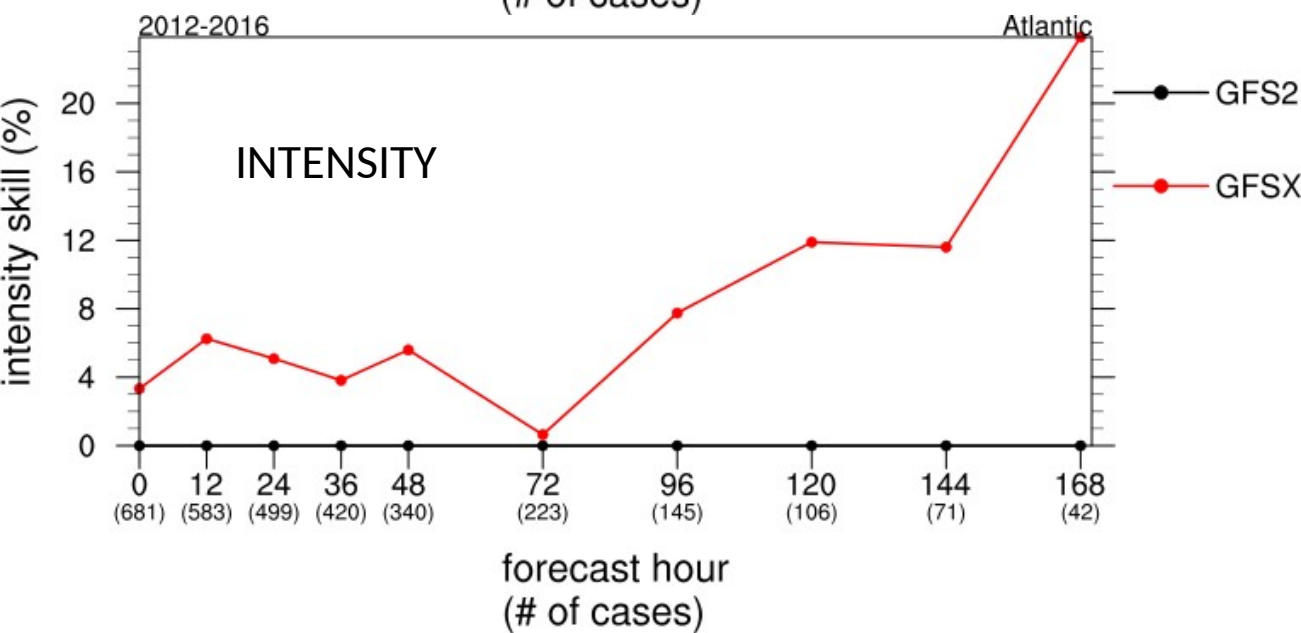
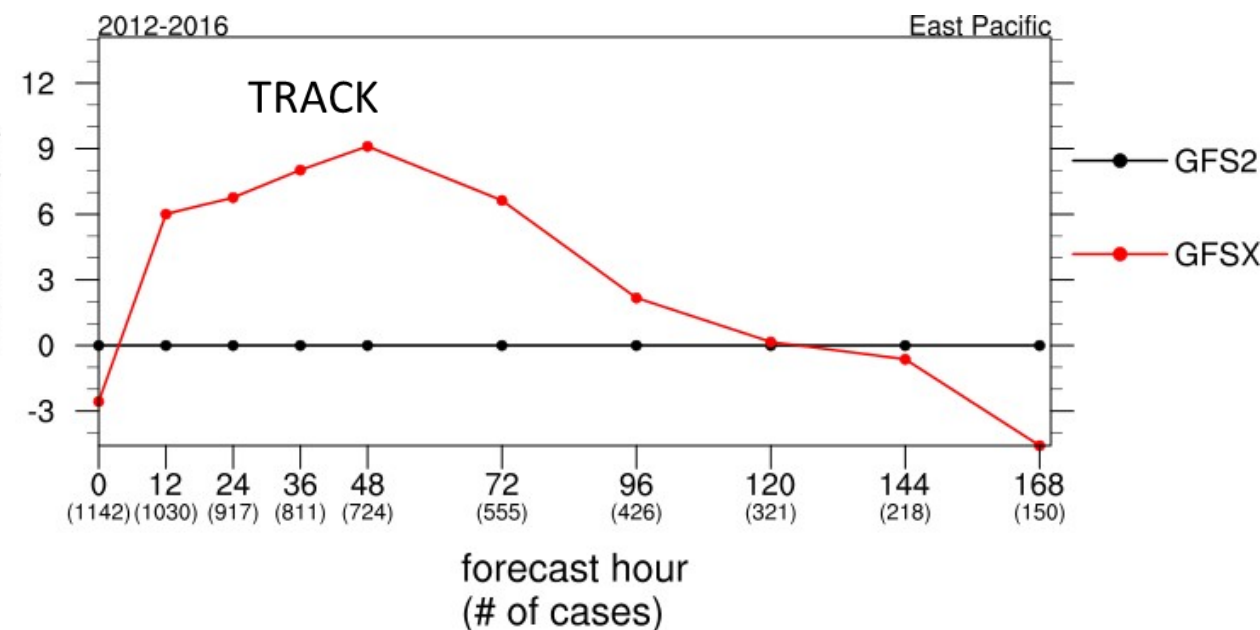
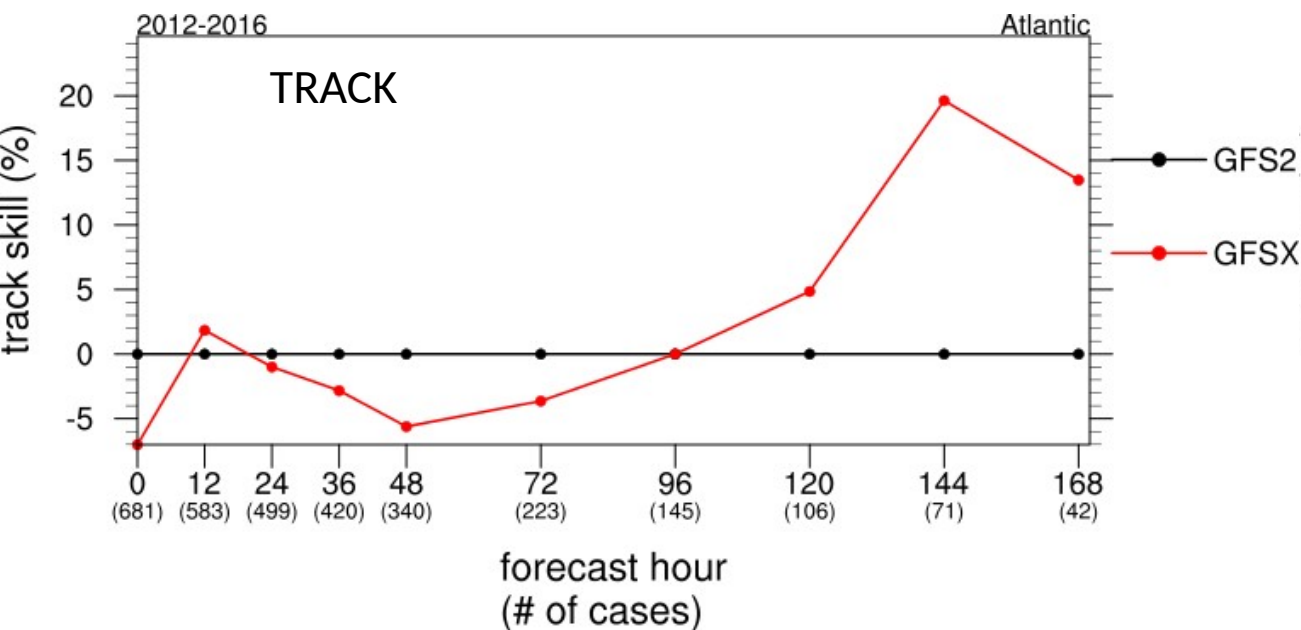


2012-2016

Atlantic

Track/Intensity Skill (with respect to GFS2)

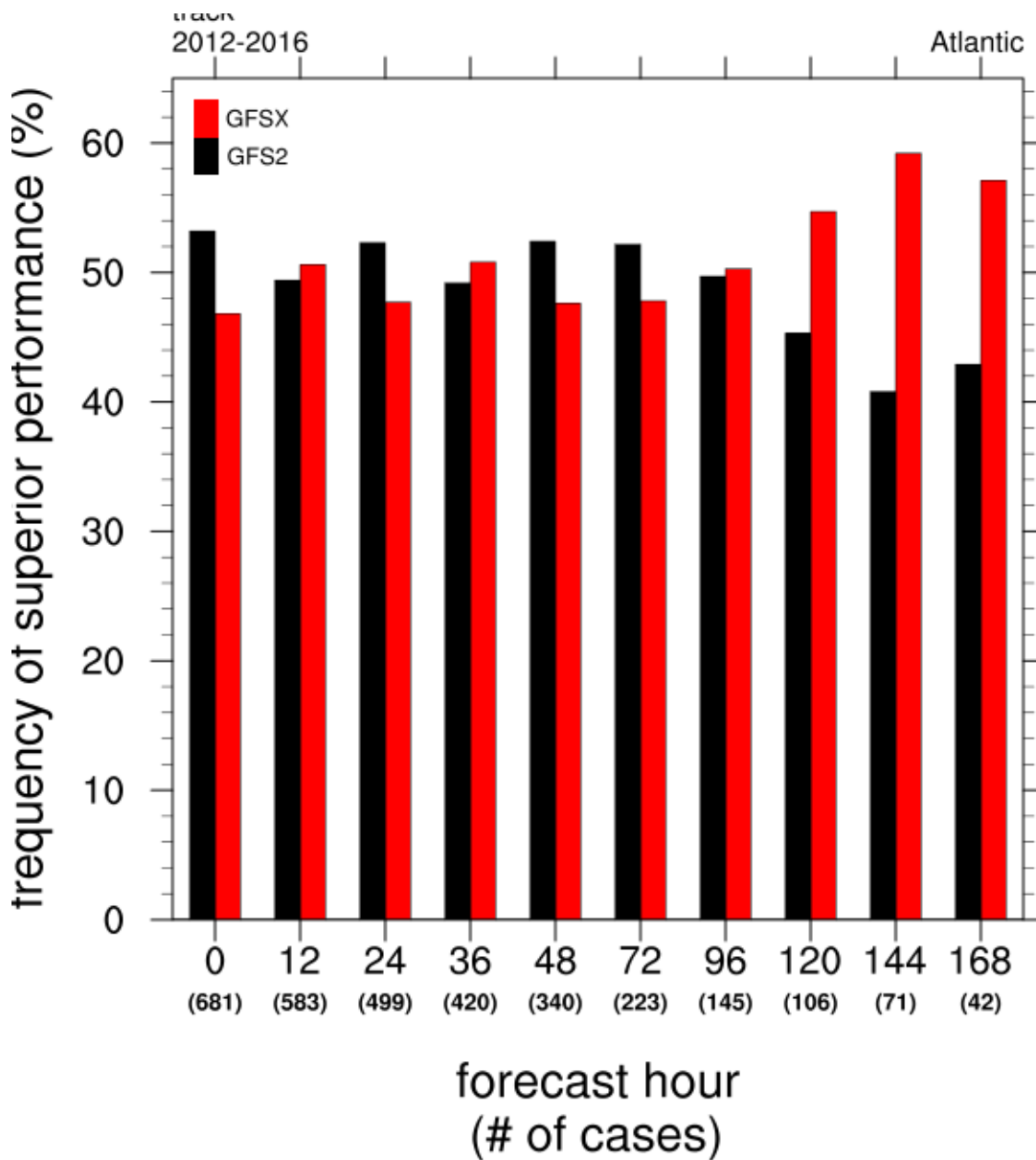
East Pacific



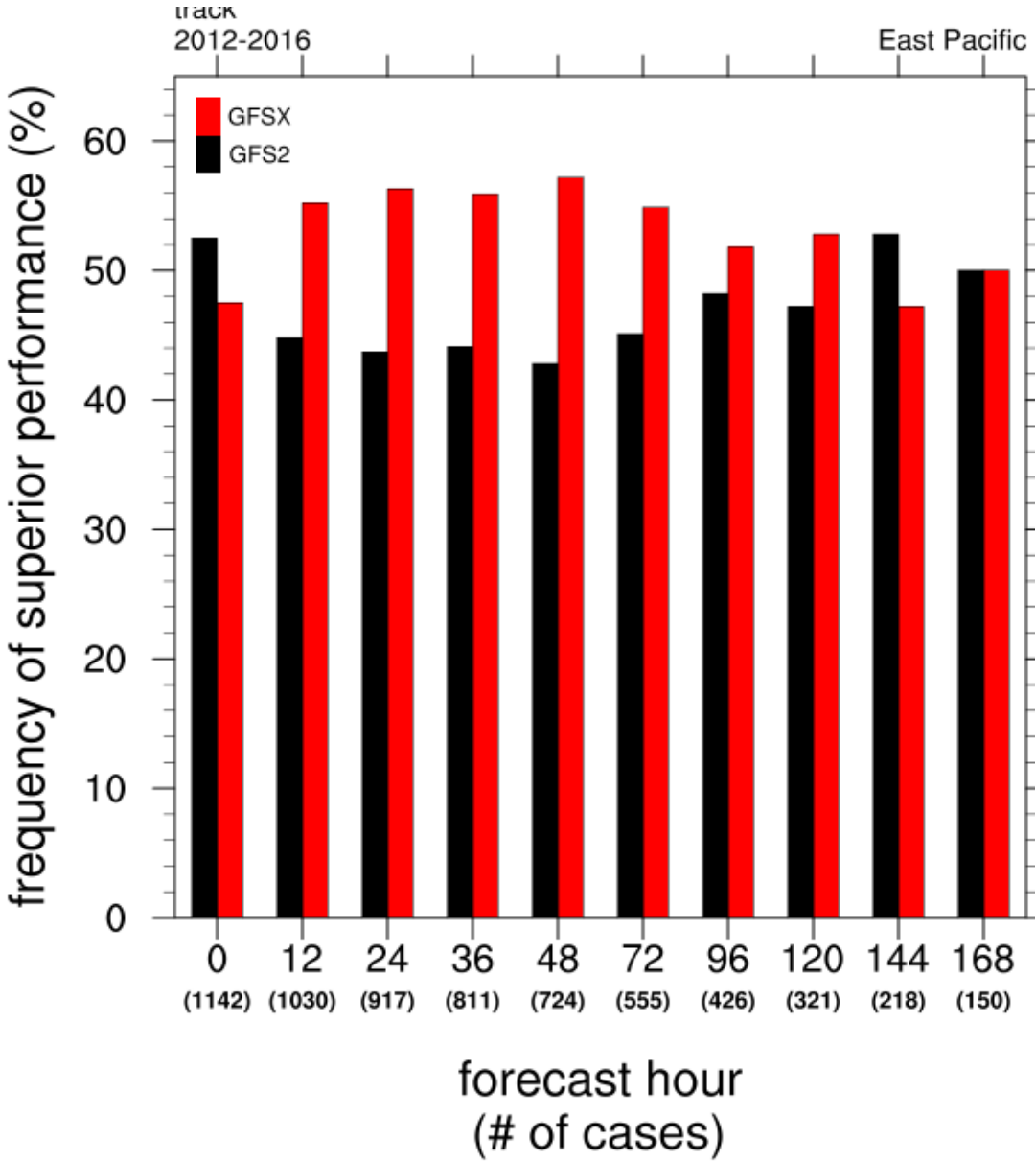
2012-2016

Frequency of Superior Performance - Track

Atlantic



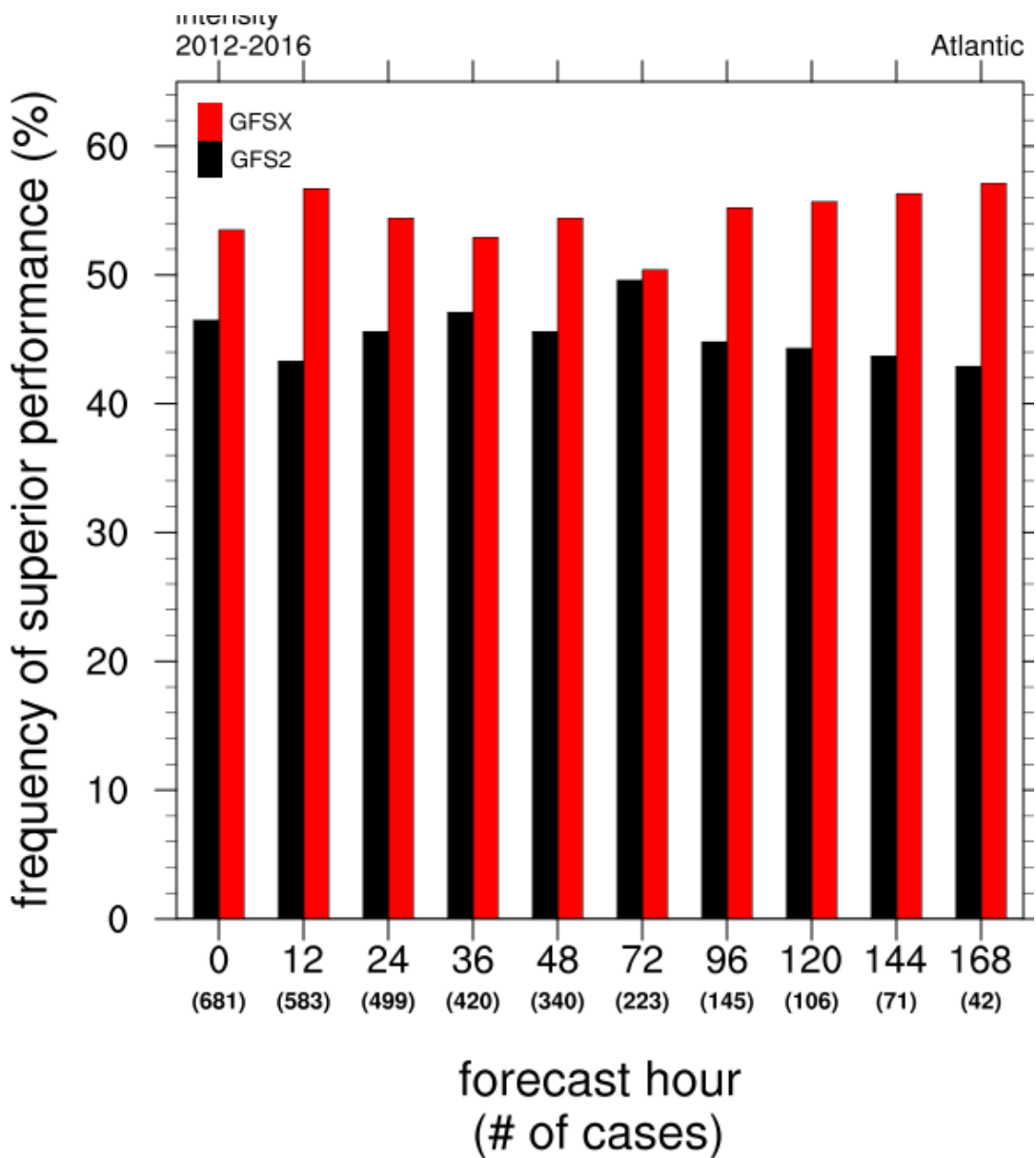
East Pacific



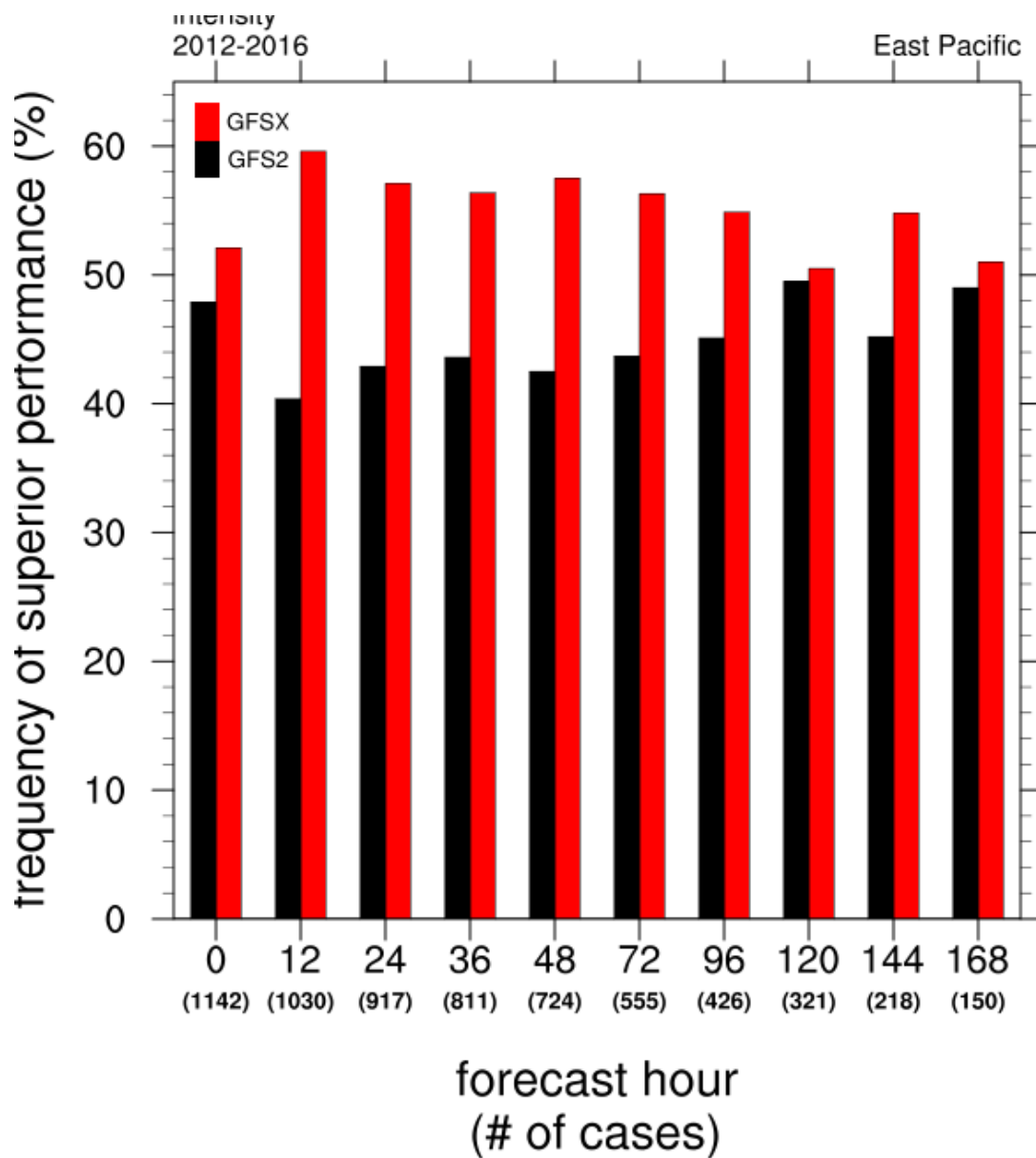
2012-2016

Frequency of Superior Performance - Intensity

Atlantic



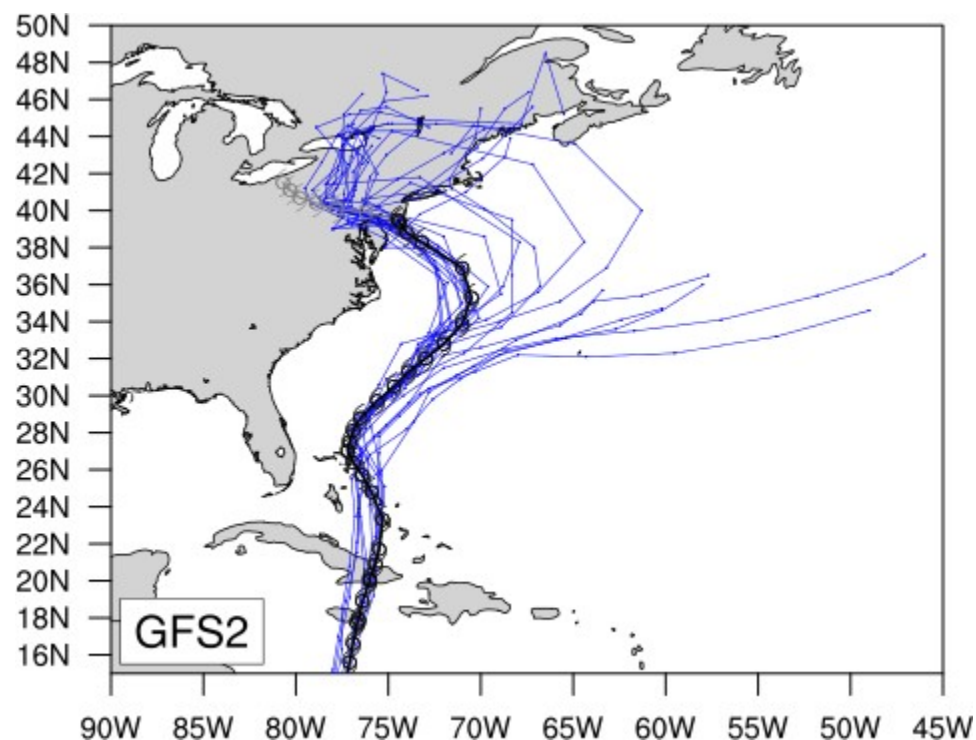
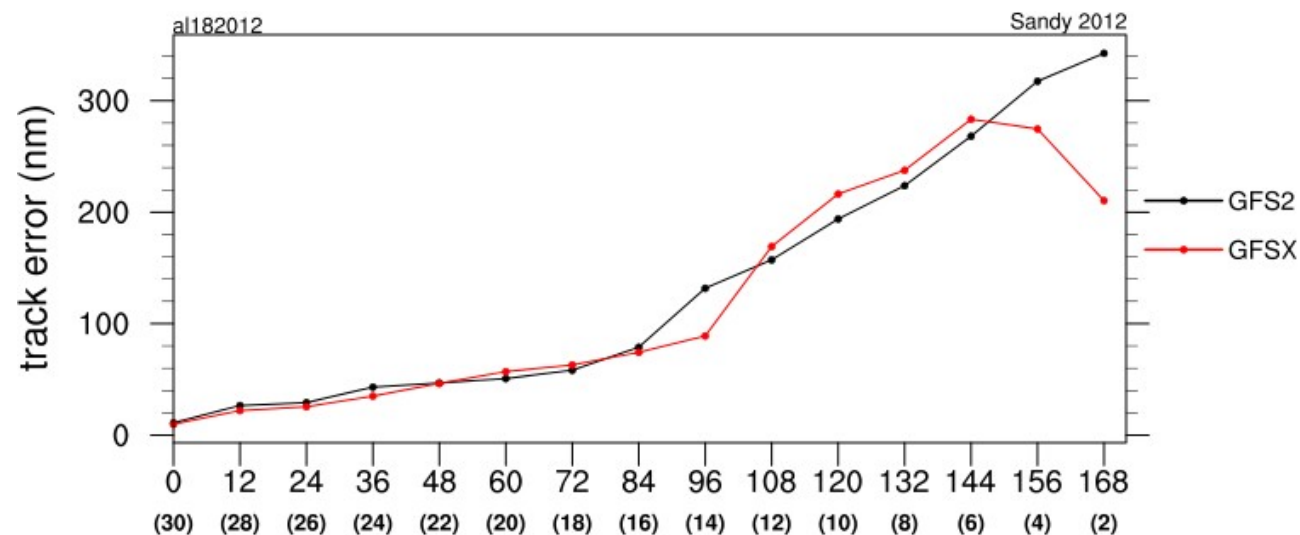
East Pacific



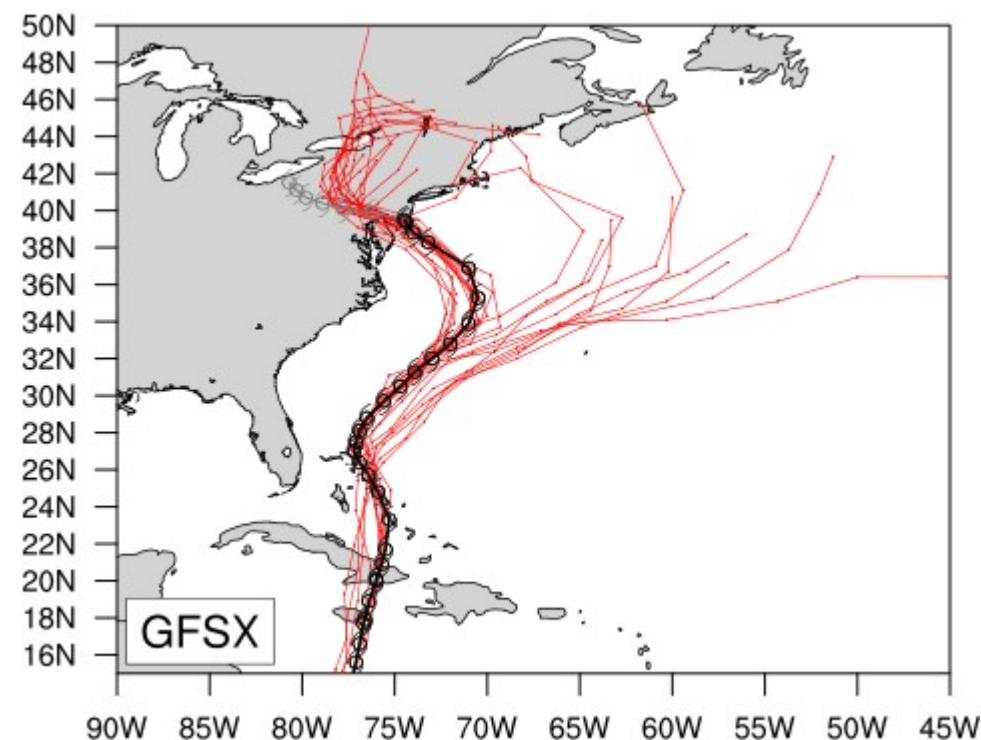
Sandy 2012

AL182012

Track

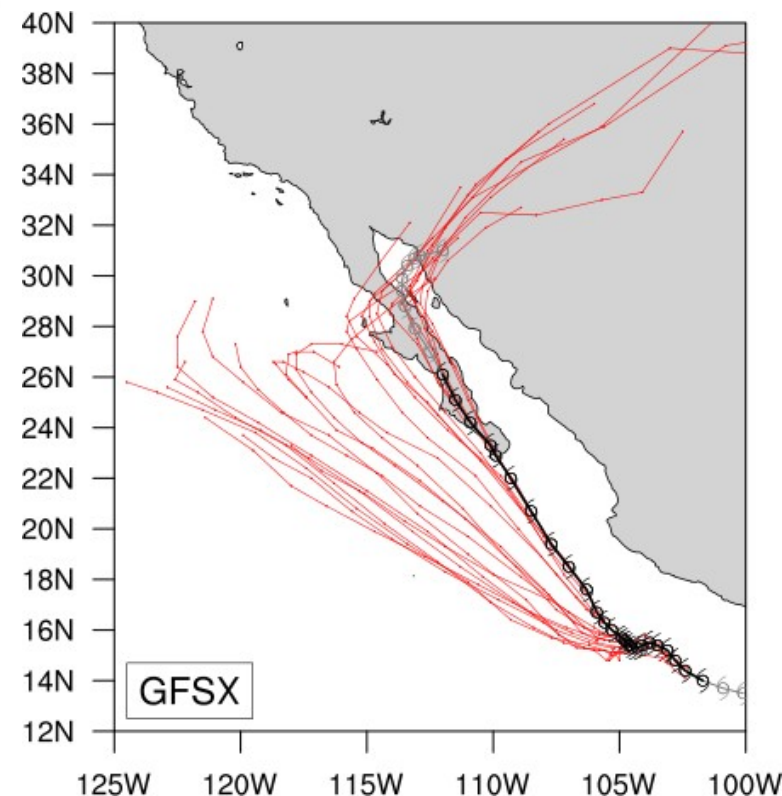
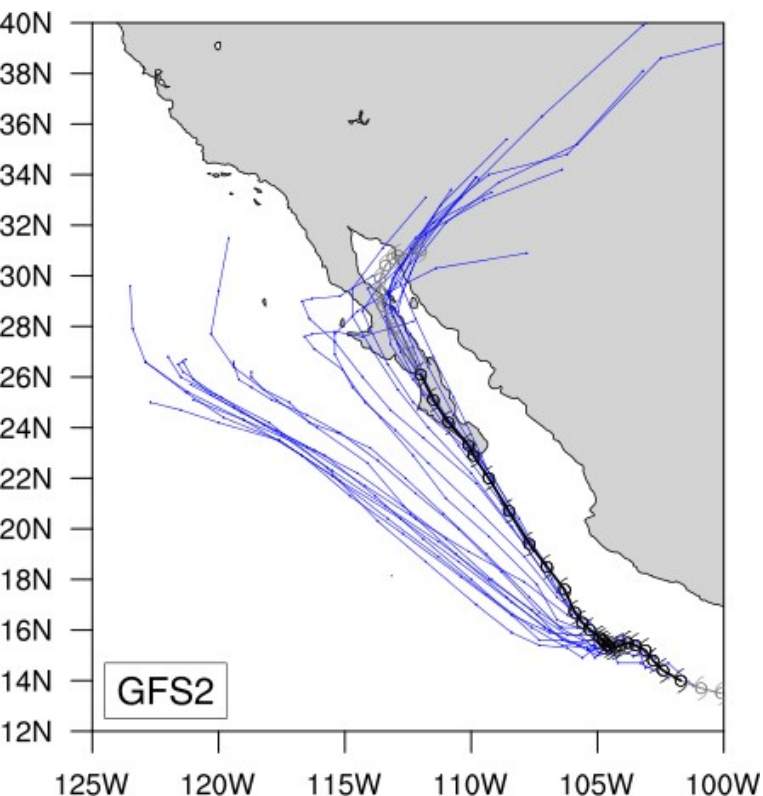
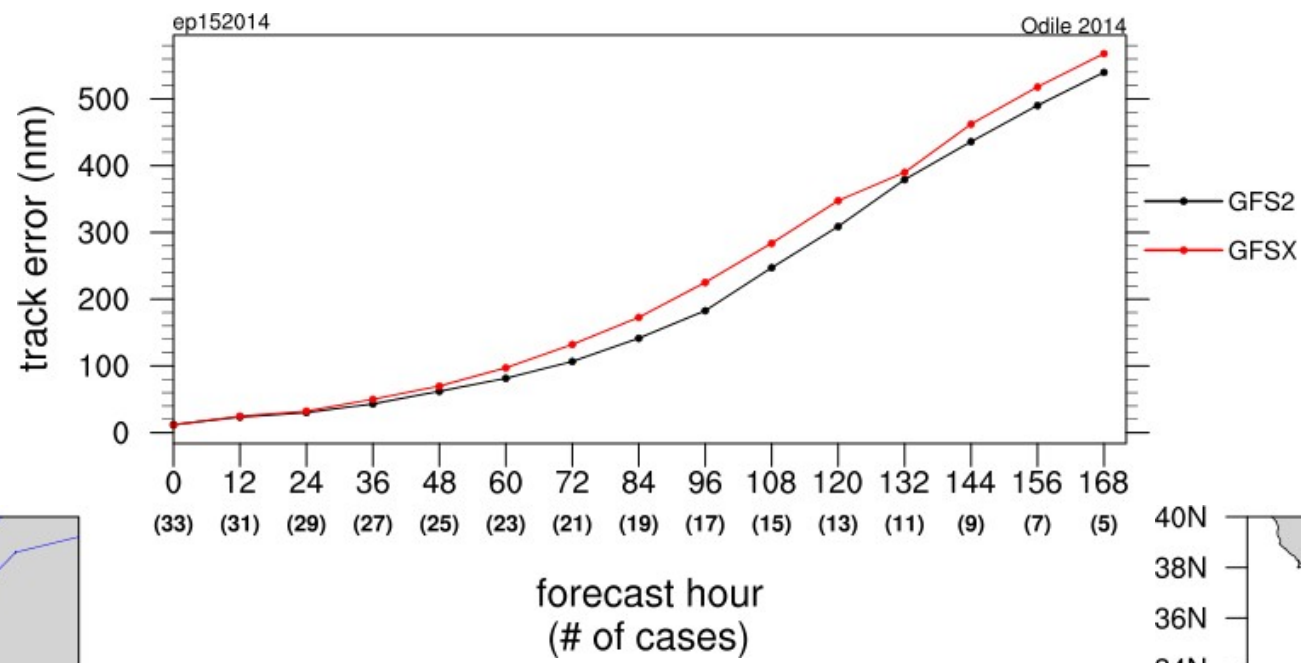


forecast hour
(# of cases)



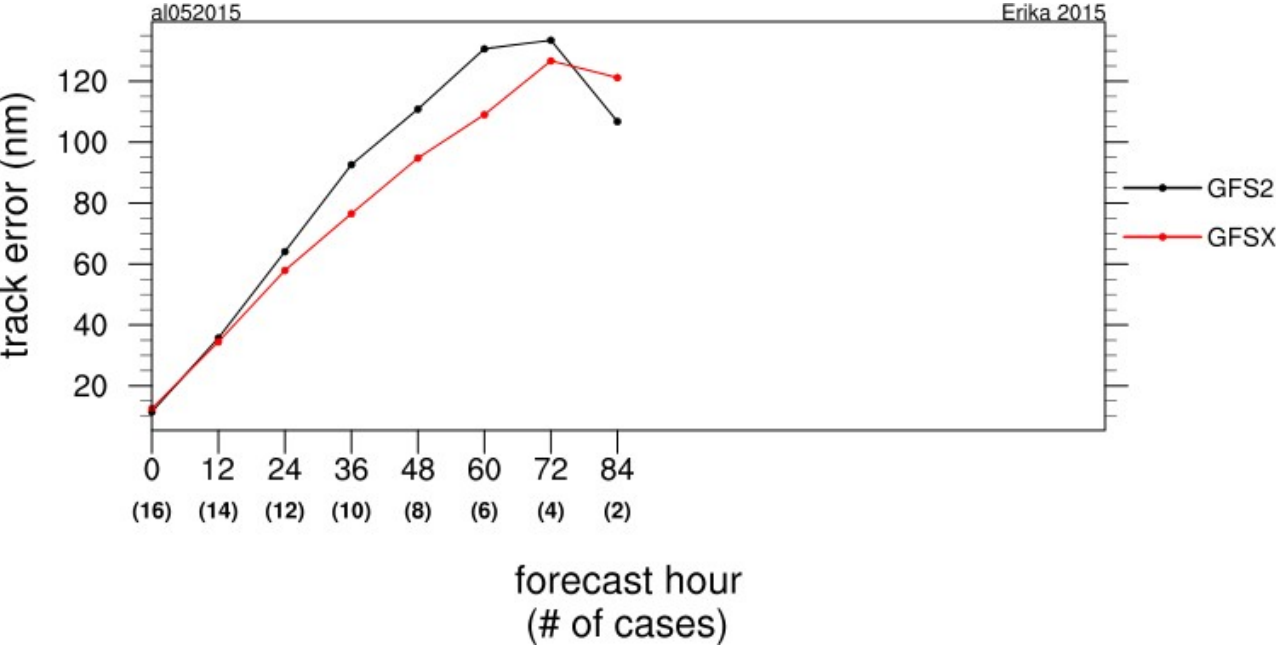
Odile 2014
EP152014

Track

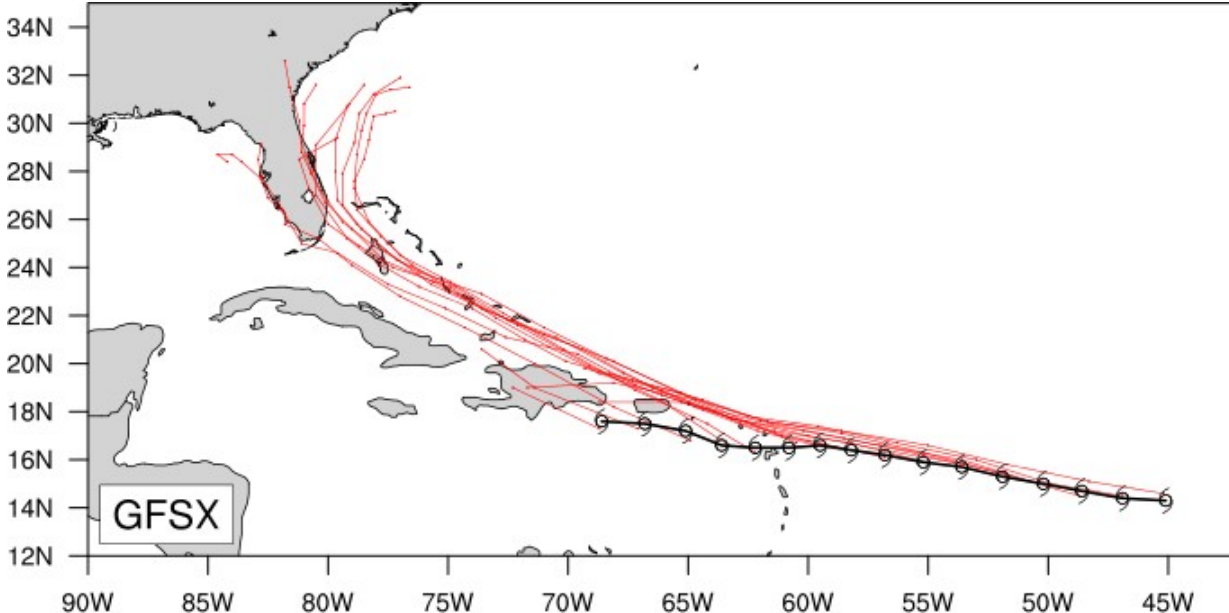
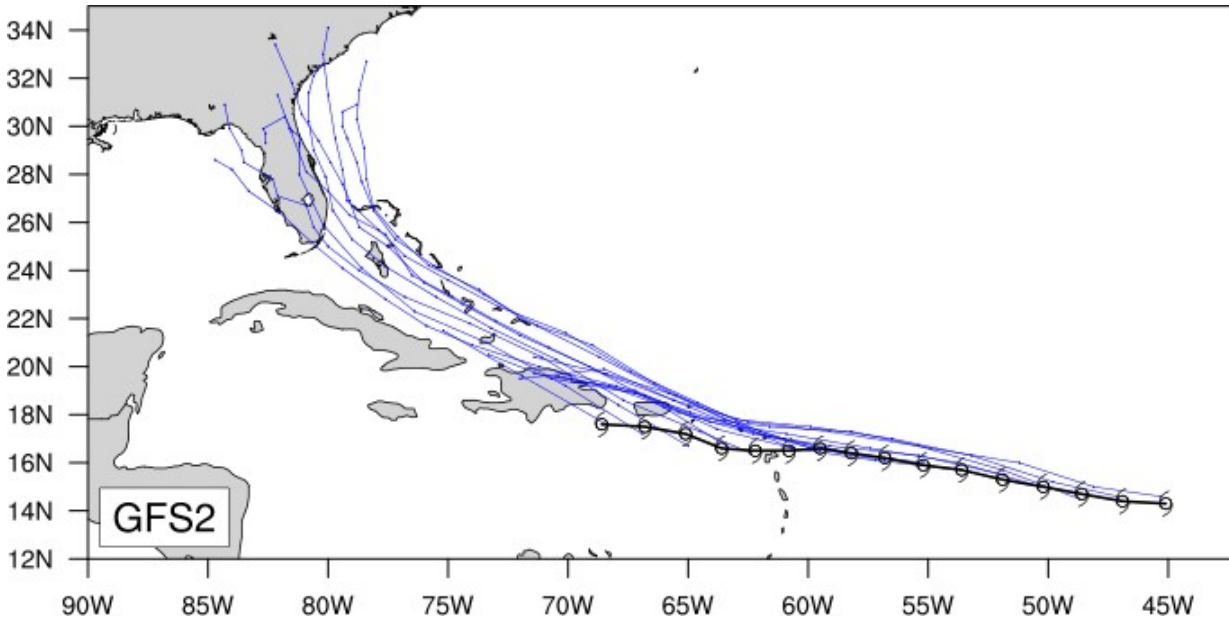


Erika 2015

AL052015



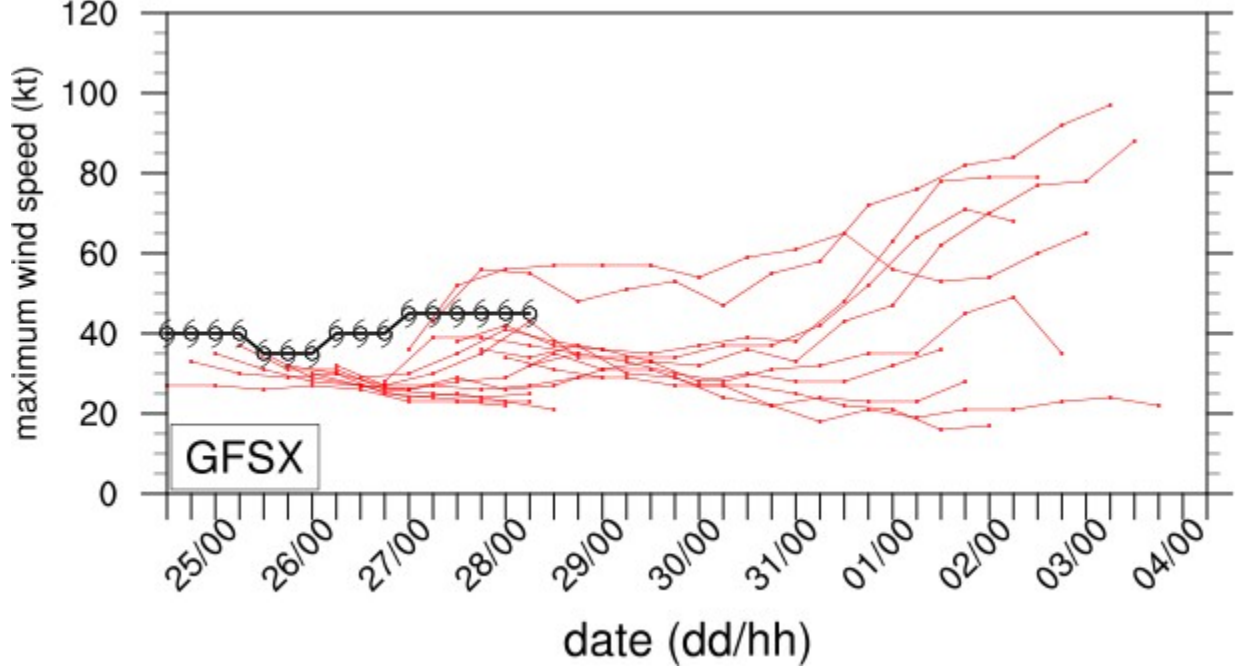
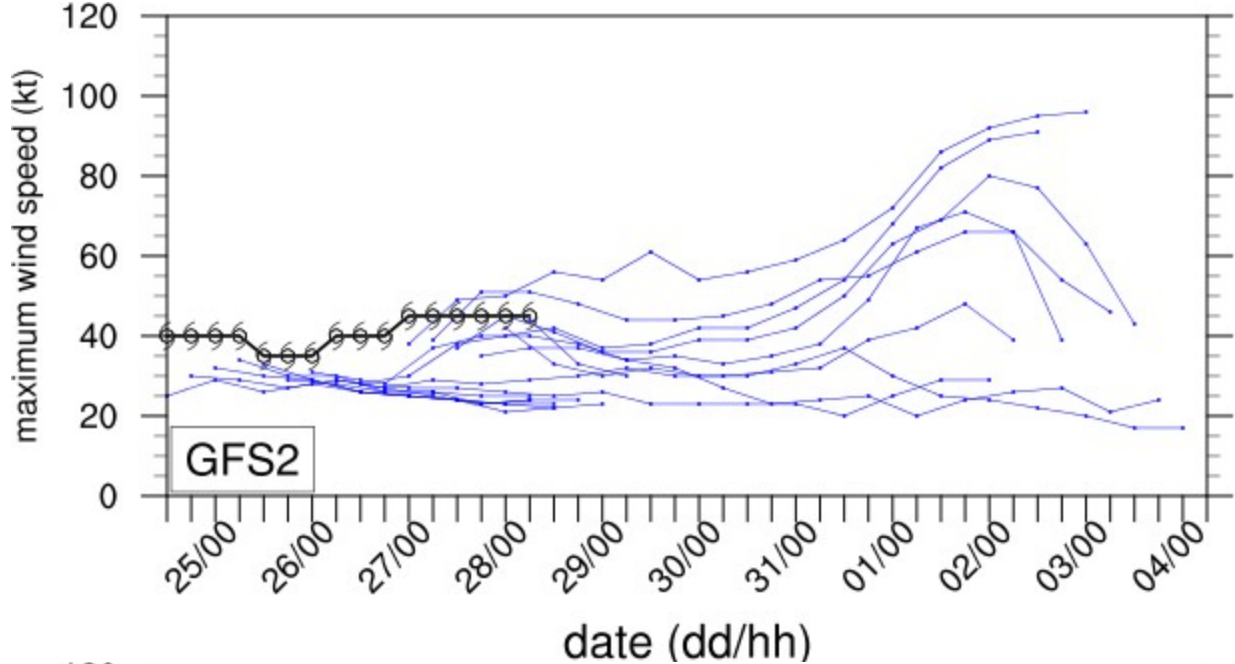
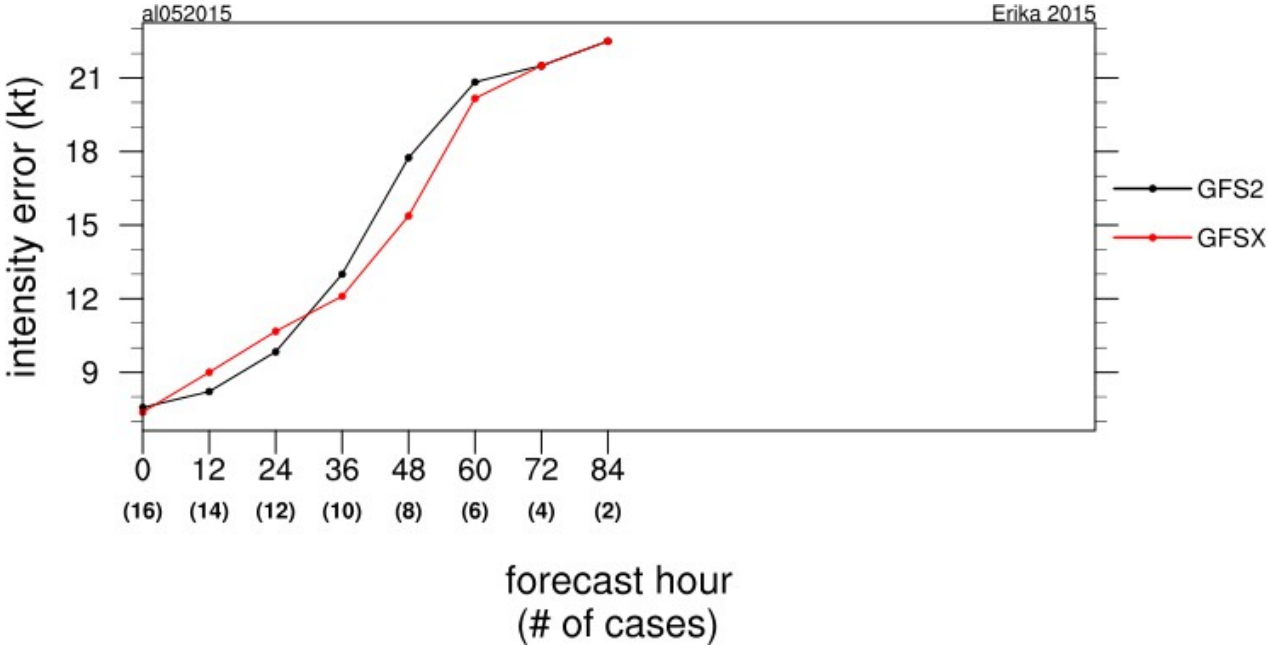
Track



Erika 2015

AL052015

Intensity

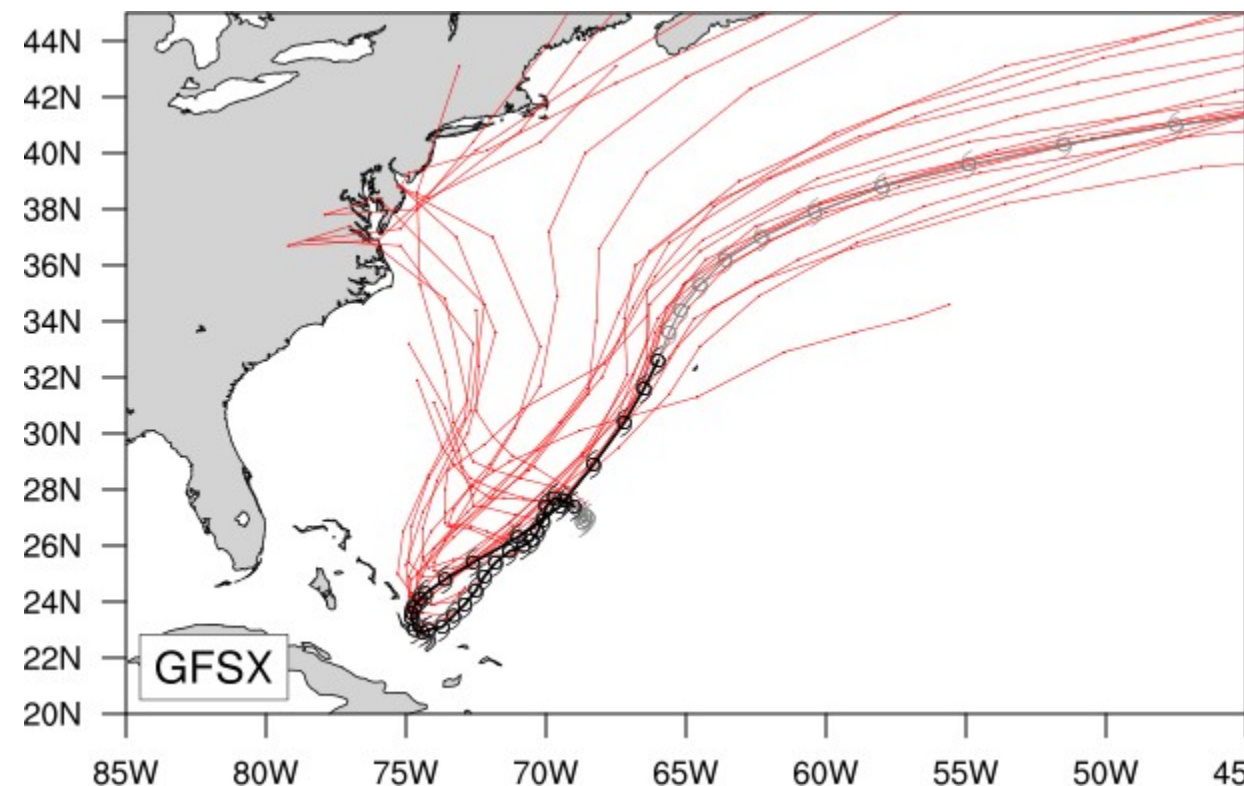
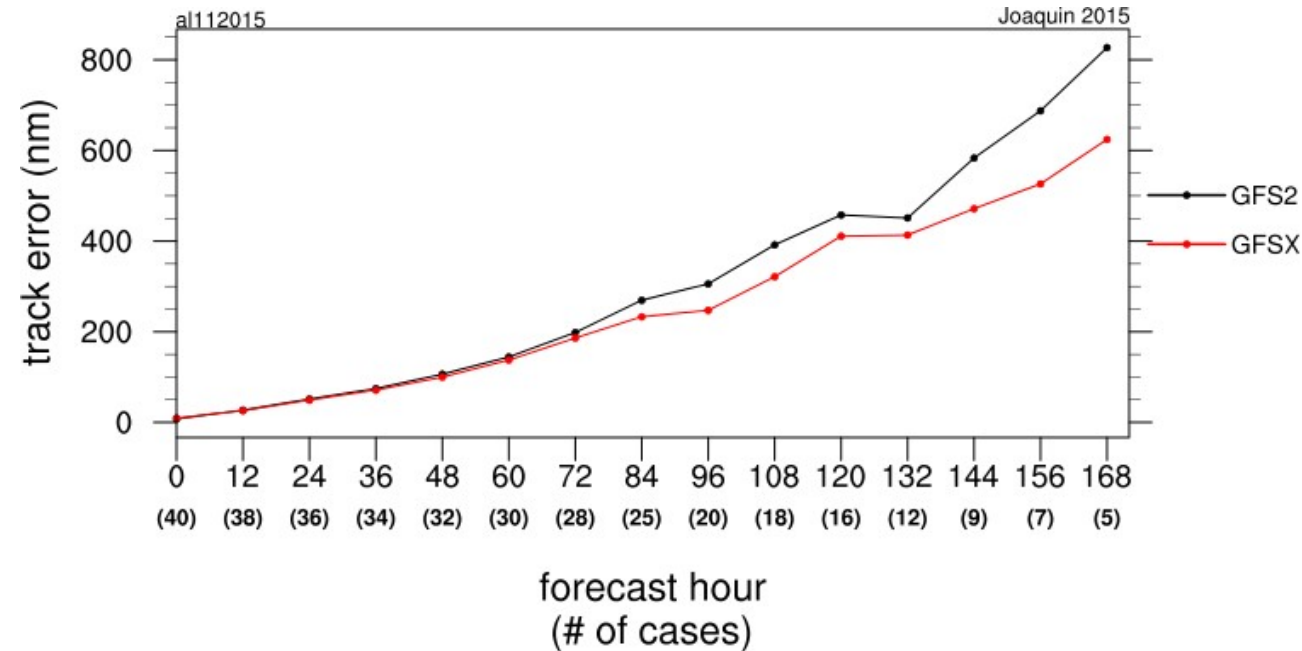
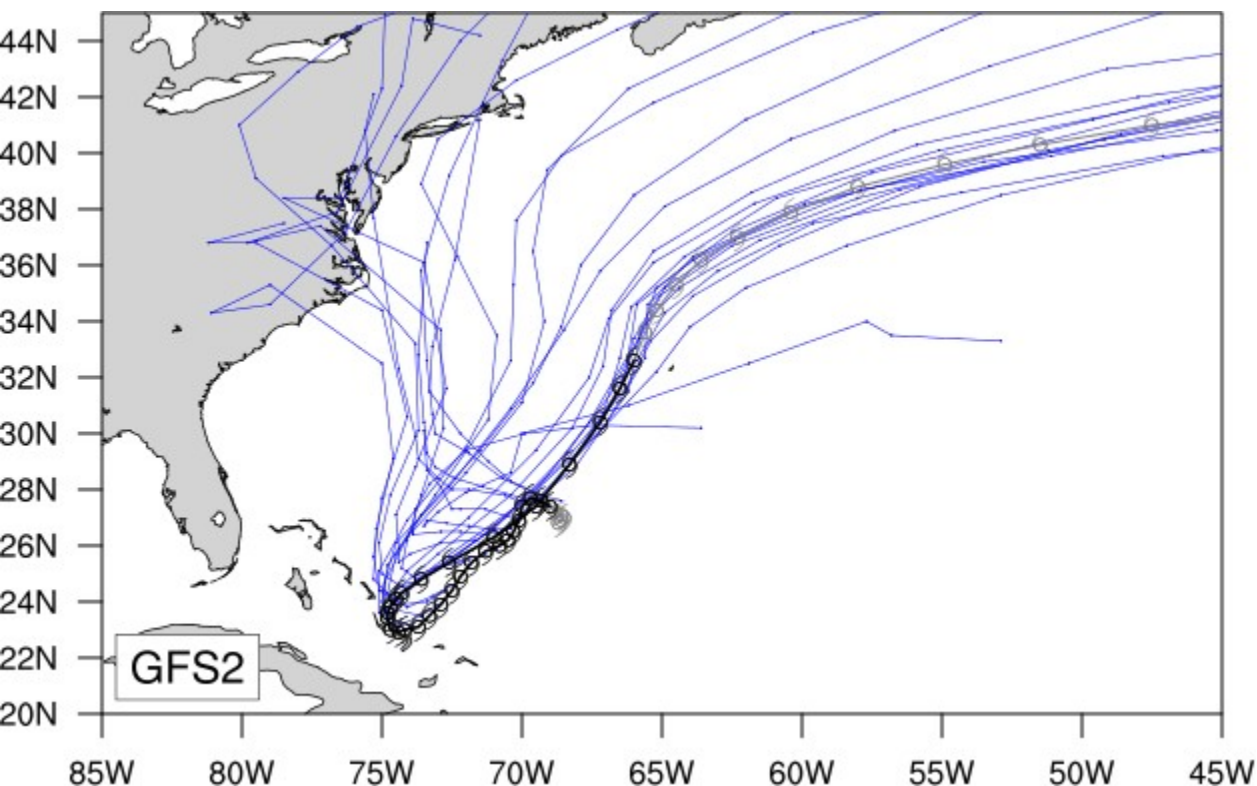


Joaquin 2015

AL112015

Track

2015-09-28 0000 - 2015-10-05 0000



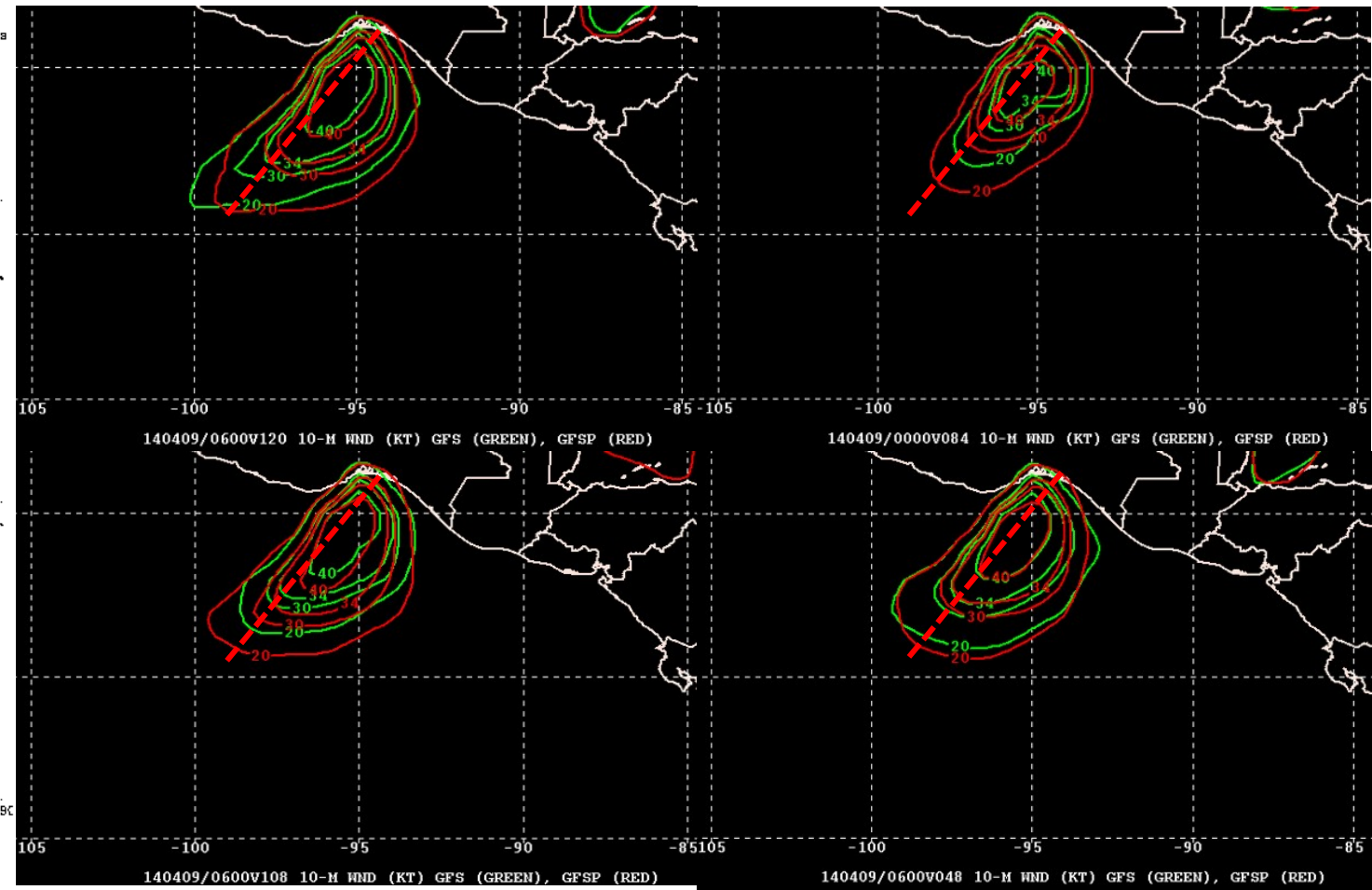
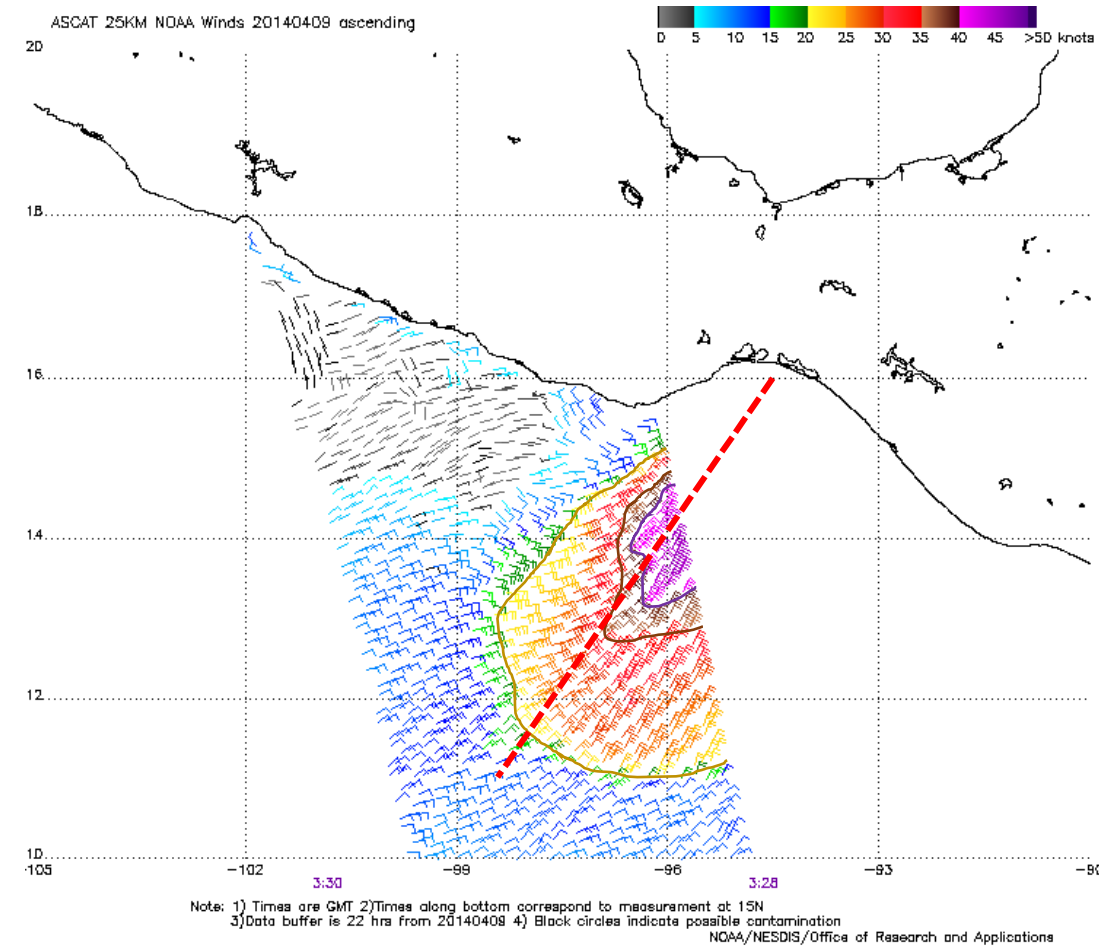
AL	Track	Intensity
0-48 h	- 3%	+5%
72-120 h	+7%	+ 11%

EP	Track	Intensity
0-48 h	+5%	+5%
72-120 h	+1%	+2%

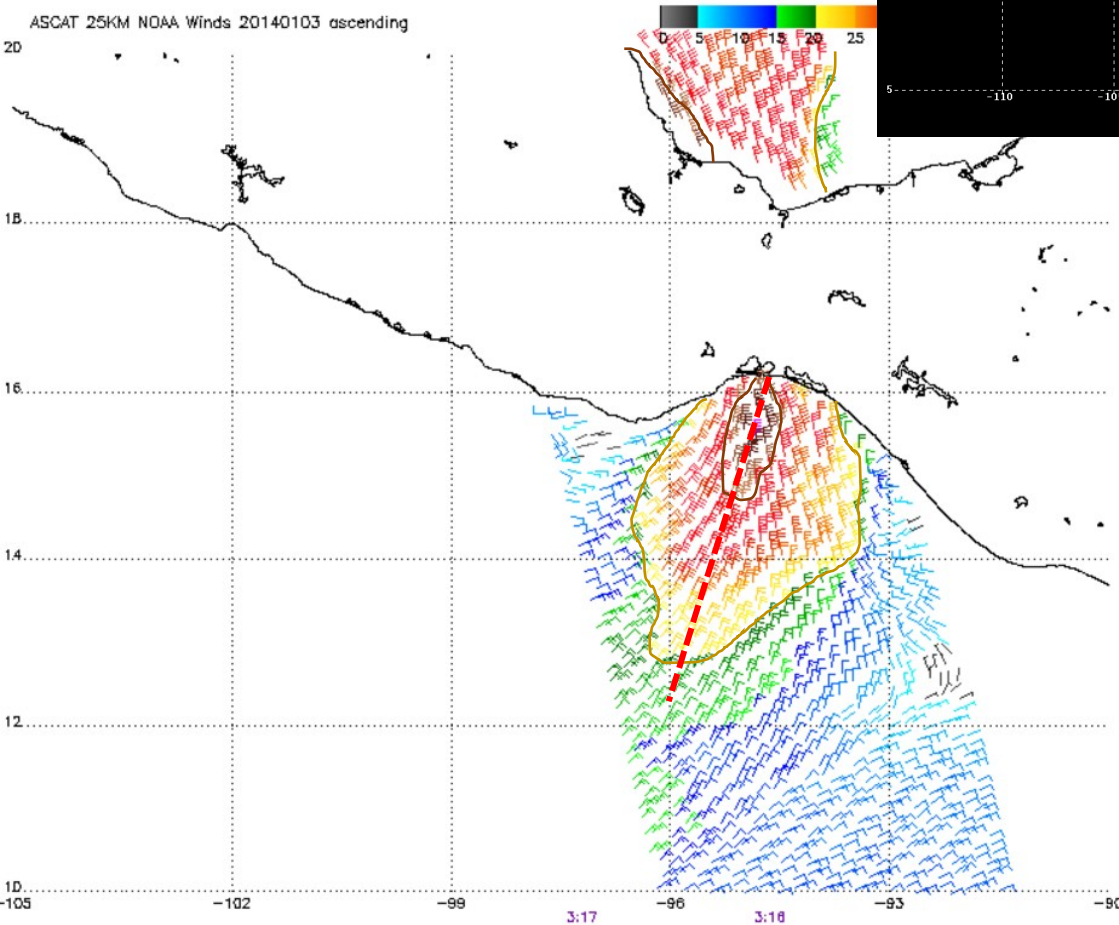
Track and intensity error improvements/degradation of Q3FY16 GFS vs. 2015 GFS for the 2012-2016 retrospective runs, by basin

Feedback from TAFB

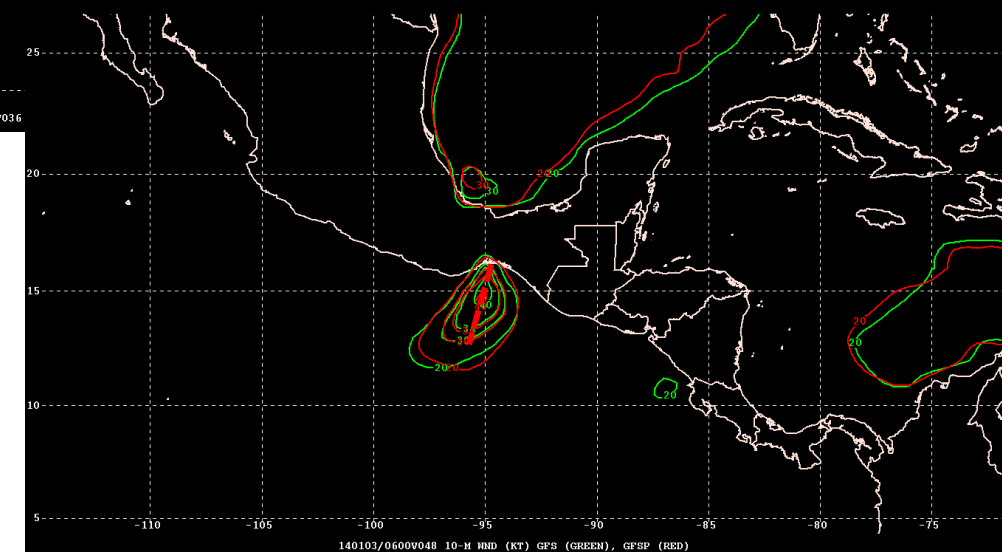
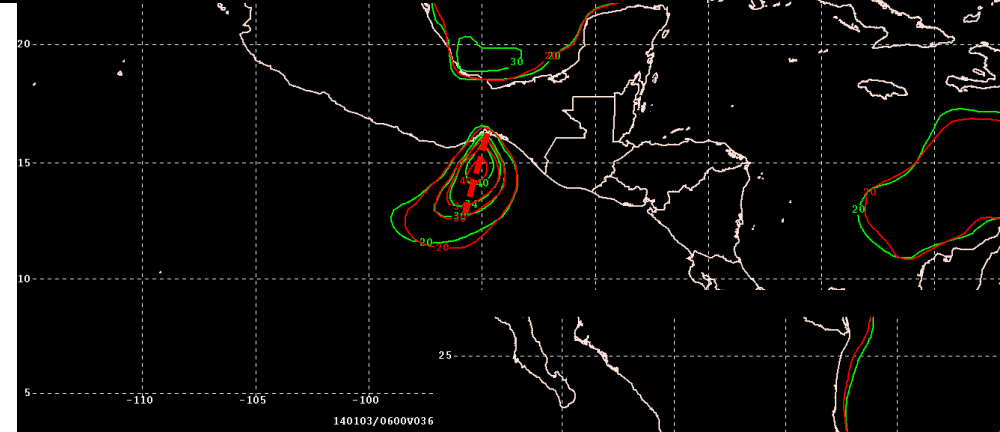
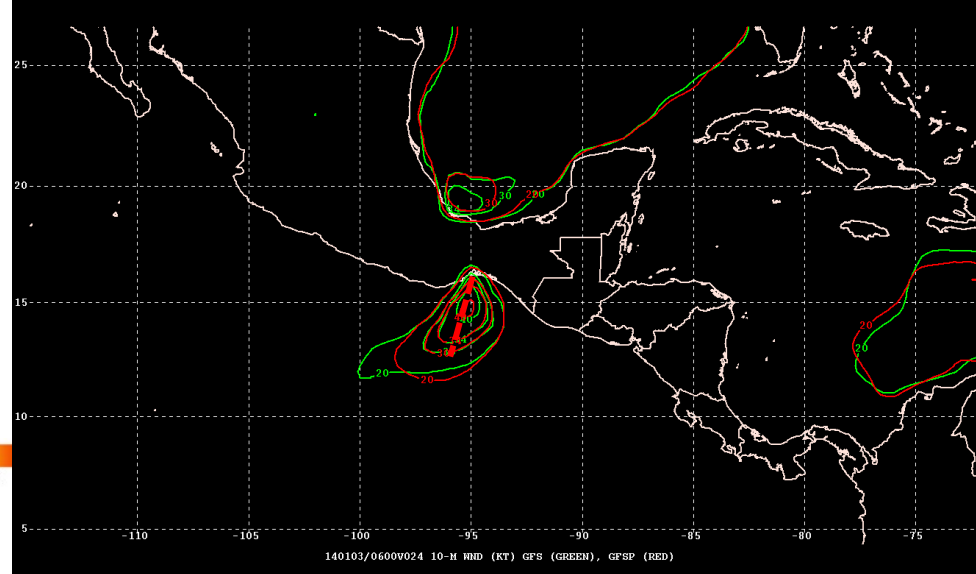
- GFSP agrees better with path of strongest wind away from the coast (more to the east than the operational GFS)
- Despite resolution differences, GFSP was stronger and more accurate with the winds forecast at F084 and F108

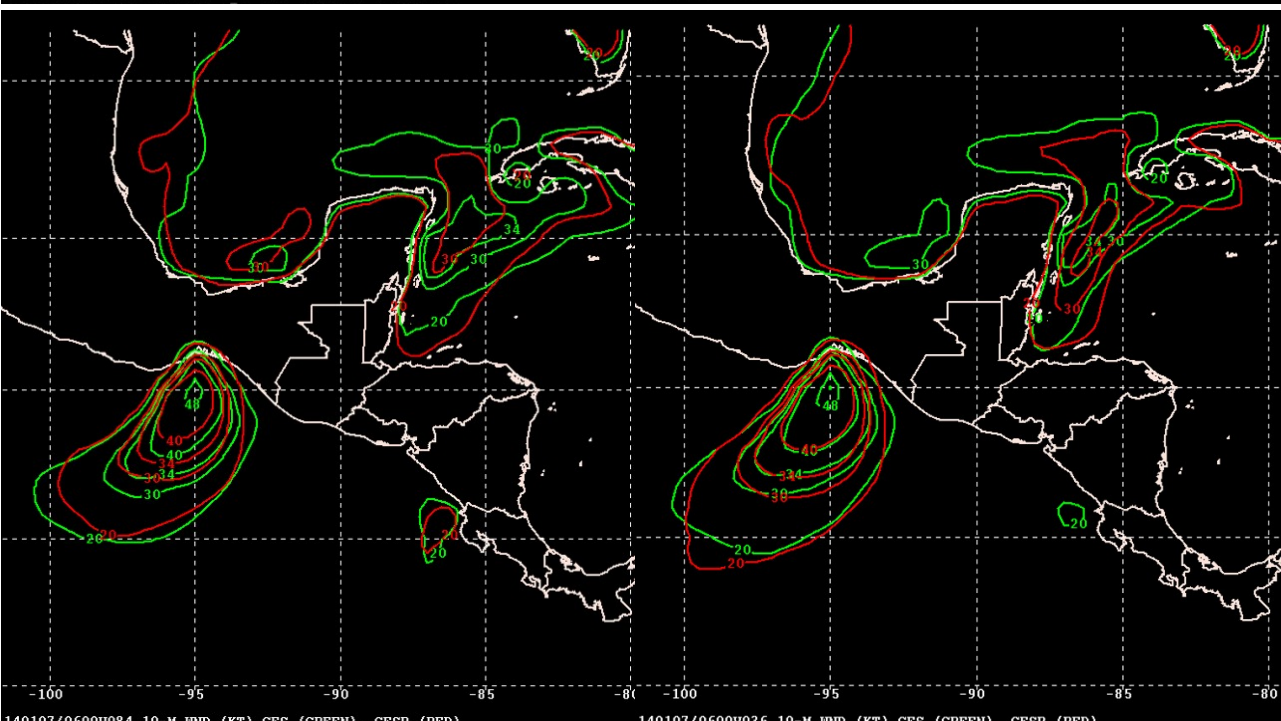
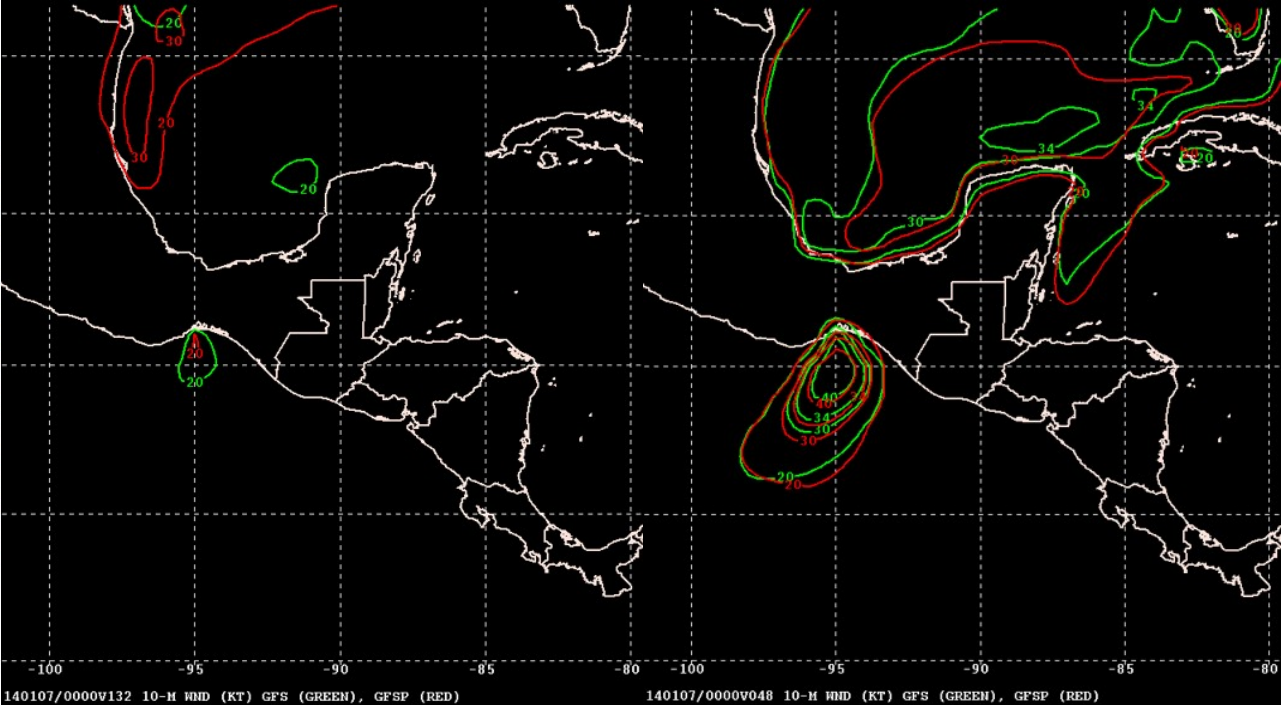
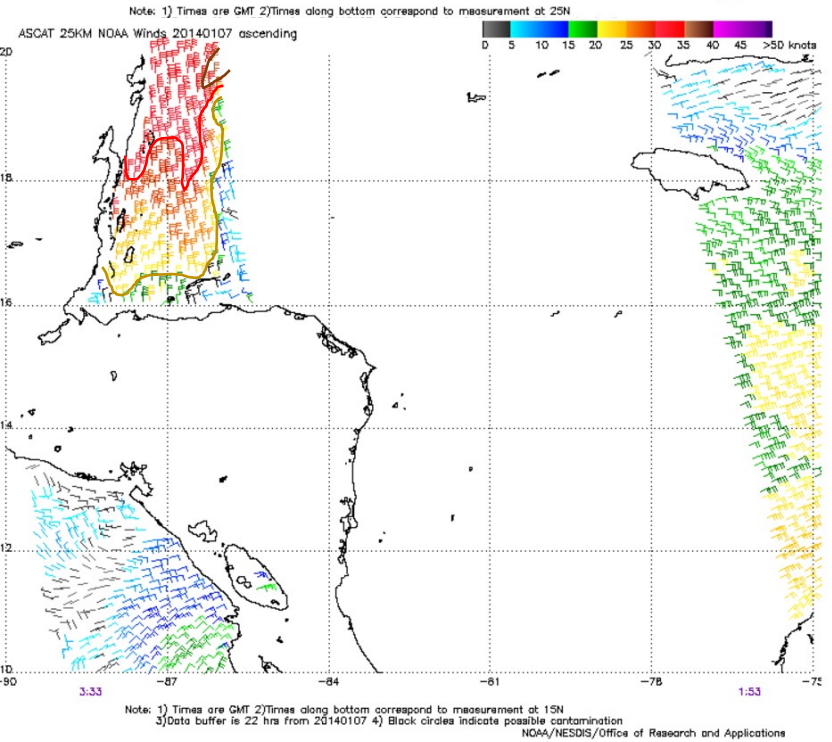
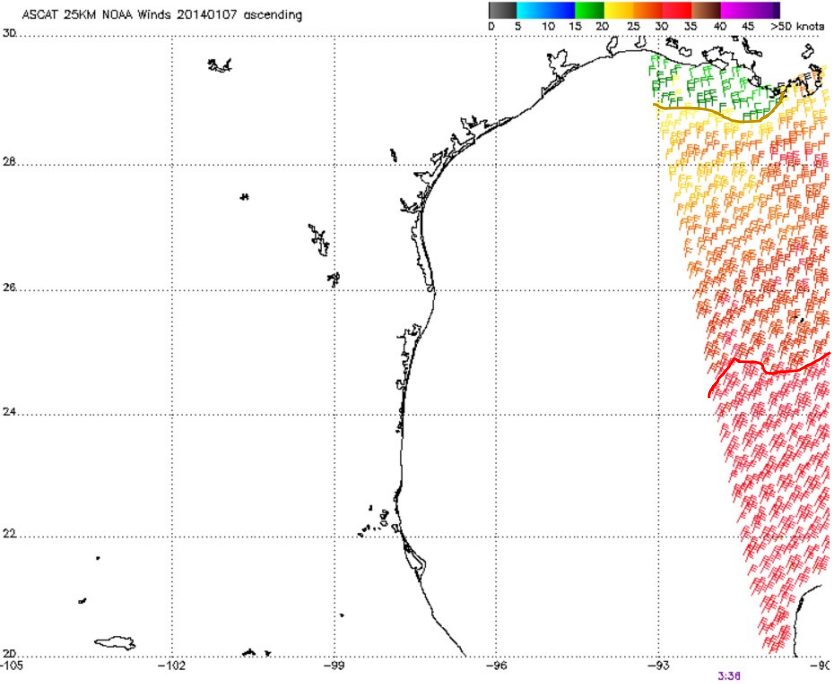


- Stronger operational GFS better in SW GOMEX
- Weaker GFSP better with the core winds south of Tehuantepec

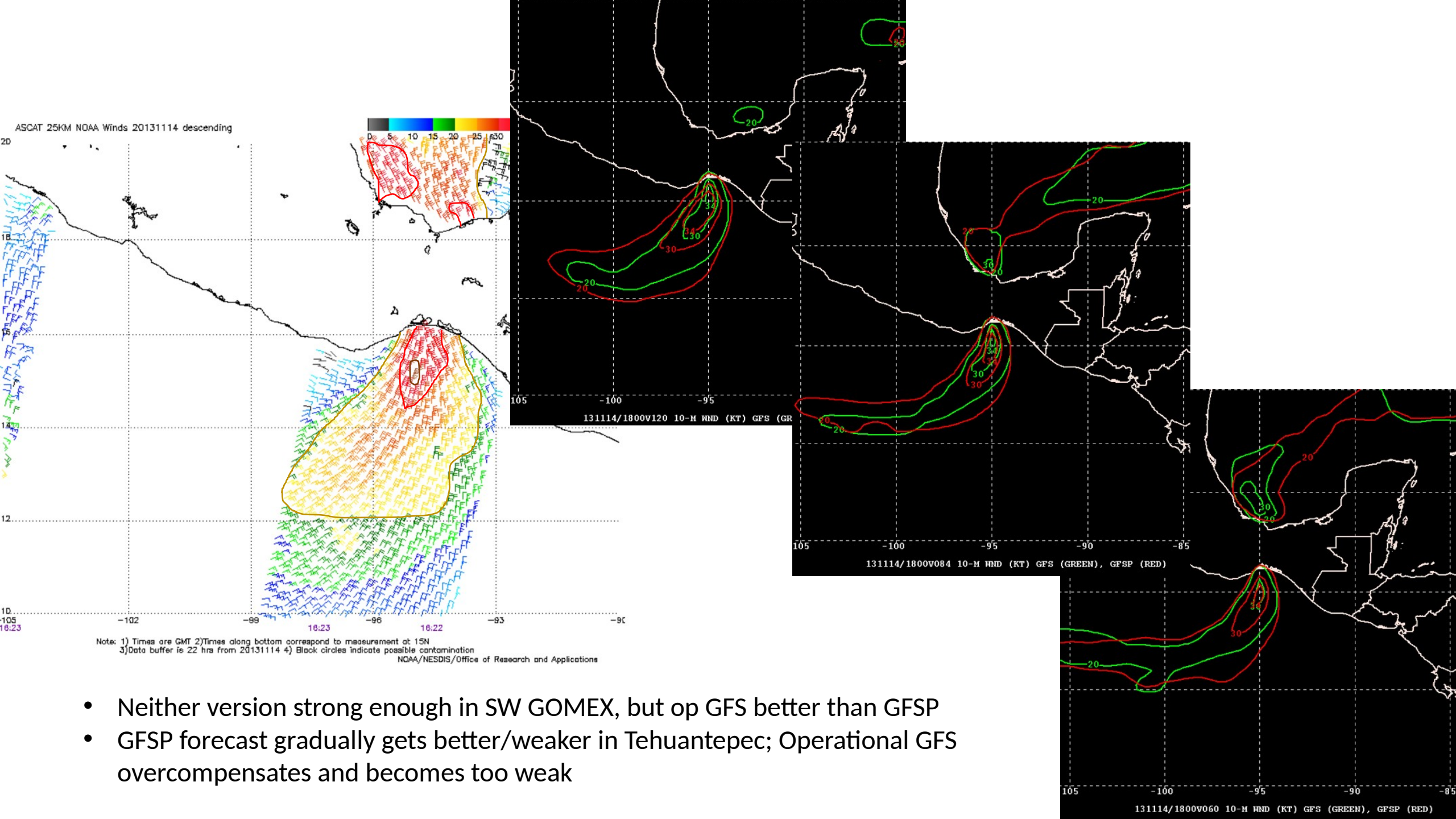


Note: 1) Times are GMT 2) Times along bottom correspond to measurement at 15N
3) Data buffer is 22 hrs from 20140103 4) Black circles indicate possible contamination
NOAA/NESDIS/Office of Research and Applications





- GFSP faster to catch on to the strength and timing of cold front in GOMEX
- GFSP better with position & coverage of the gale force winds in NW Carib.
- FH036 GFSP closer to 20 kt contour N of Honduras than op GFS

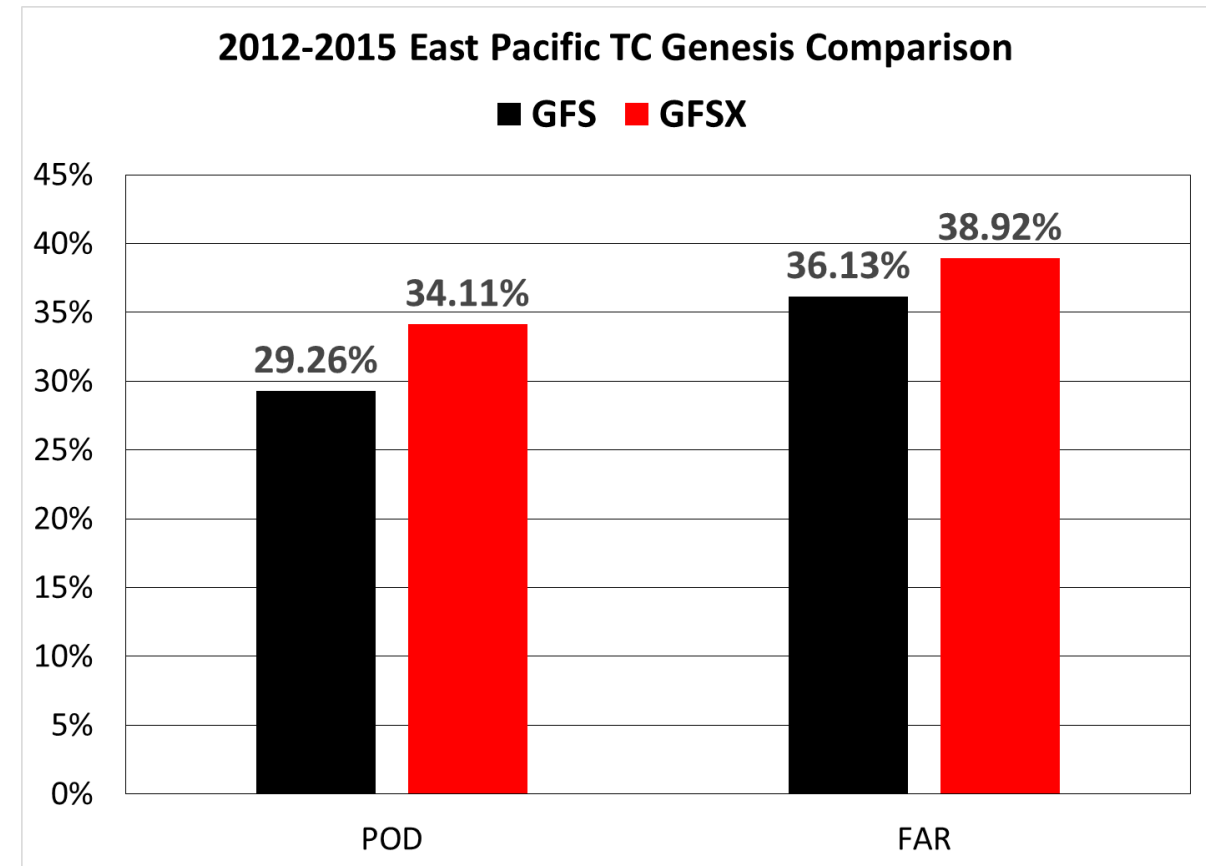
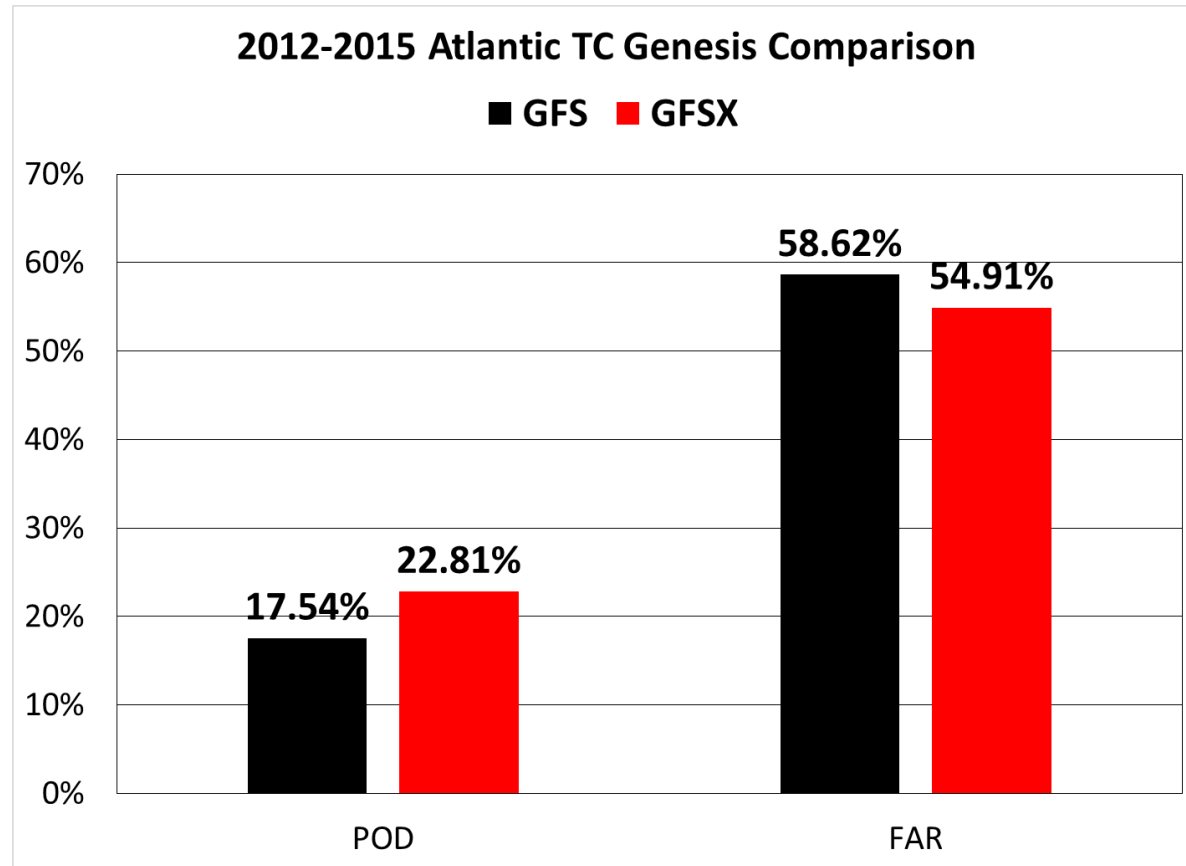


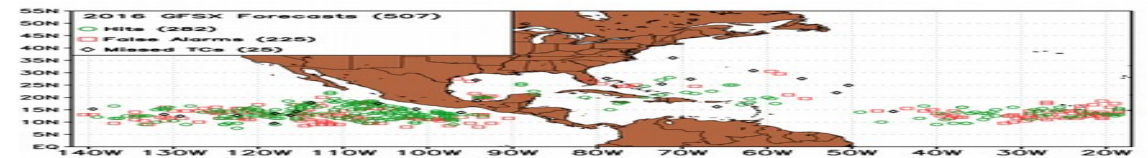
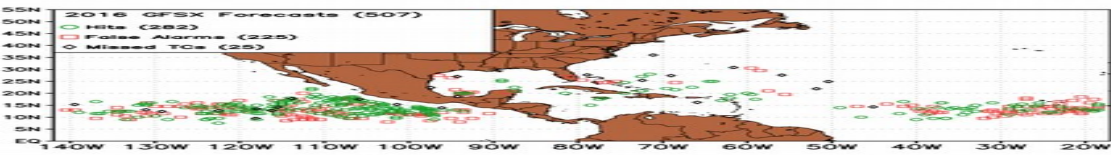
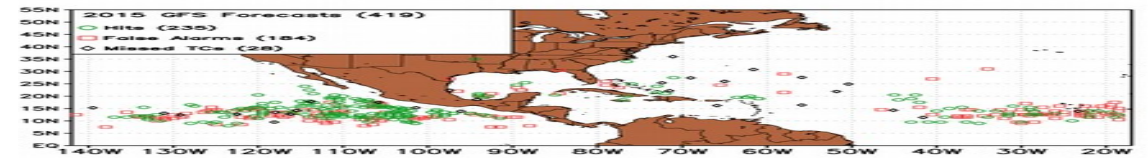
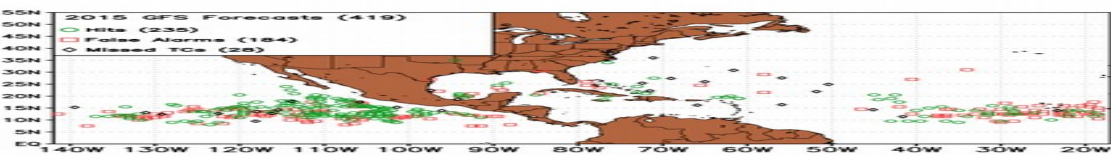
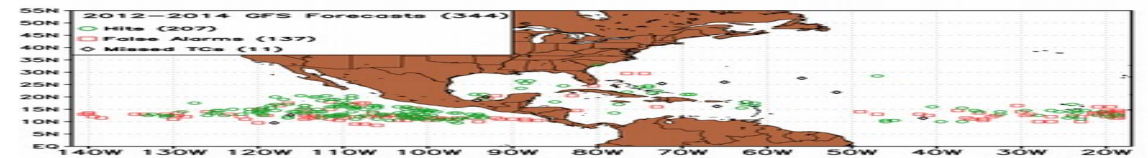
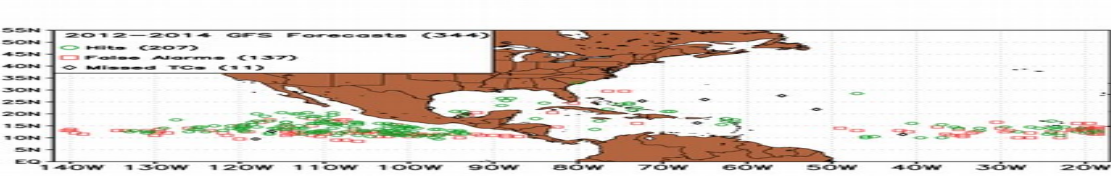
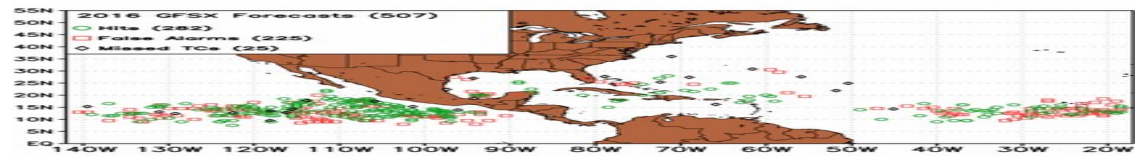
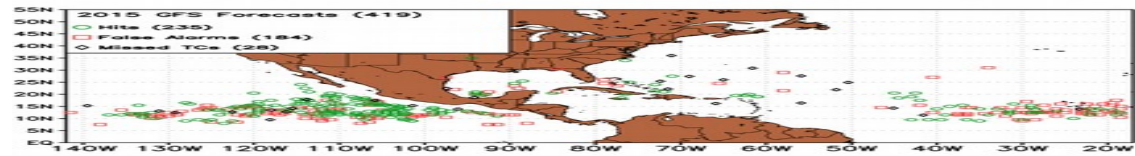
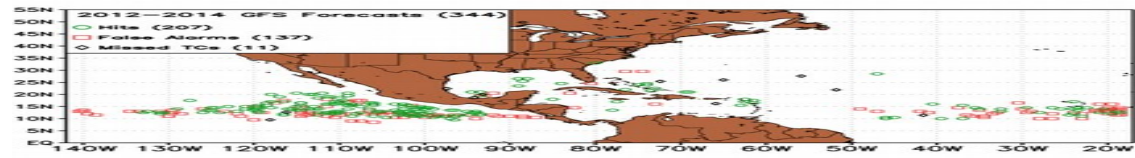
- Neither version strong enough in SW GOMEX, but op GFS better than GFSP
- GFSP forecast gradually gets better/weaker in Tehuantepec; Operational GFS overcompensates and becomes too weak

Comments from TAFB

- Based on limited cases with archived operational GFS on 1° grids and the retrospectives (GFSP) on 0.5° degree grids
- Results were a mixed bag, but the GFSP seemed to have an advantage at longer lead times

Verification of TC cyclogenesis in the GFSX – comparison to current and previous version of the GFS (courtesy of Dan Halperin and Bob Hart)





Concluding Remarks

- GFSP has mostly improved TC track and intensity forecasts in comparison to current GFS.
- GFSP in general handles gap wind events a little better than the current GFS, especially at longer time ranges.
- In comparison to the current GFS, the GFSP has a higher POD for TC genesis in both basins and a lower FAR in the Atlantic, but a higher FAR in the east Pacific – so overall the new GFS is better at predicting genesis.

Concluding Remarks (cont.)

- This evaluation was hampered by issues related to large volumes of data, particularly for the TC genesis verification which needed to be done externally, and the way the retrospective runs were done (split between EMC and NCO).
- A remaining concern is the downstream impact of the GFSP on the HWRF and GFDL hurricane models. Reruns of these models for the 2012-2016 sample, which were promised, are not nearly complete, and time has apparently run out to finish the job.
- Since the impact of the GFSP on the HWRF and GFDL hurricane models remains unknown, **NHC cannot endorse this implementation. However, NHC does not oppose it.**